ENHANCING THE COMPETITIVE ADVANTAGE OF THE SOUTH AFRICAN CULTIVATED ABALONE INDUSTRY

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work ant that I have not previously in its entirety or in part submitted it at any university for a degree.

WH Gerber

ABSTRACT

The primary aim of this study was to investigate the national competitive advantage of the South African abalone industry. A further aim was therefore to investigate the environment, in which the South-African abalone industry operates. Secondary aims included presenting a detailed description of the role-players in the South African abalone industry, and considering whether the South African abalone industry can be made more competitive and, if so, how this can be achieved. The achievement of these aims required a framework to establish which data is necessary for the task. The framework selected involved a combination of Porter's Five Forces analysis and Diamond Model.

The study suggests that South African abalone firms should promote South African abalone more actively, invest more funds in human resources, and that the industry's faith in government needs to be restored, which can be achieved by improving the services offered by public institutions like the South African Bureau of Standards (SABS), the Department of Trade and Industry (DTI) and Marine and Coastal Management (M&CM).

OPSOMMING

Die doel met die studie was om die nasionale kompeterende voordeel van die Suid Afrikaanse perlemoen industrie te ondersoek. Om dit te bereik, moes die omgewing waarin die industrie fuksioneer ontleed en die rolspelers in die industrie deeglik beskryf word. 'n Verdere doel was om te bepaal of dit moontlik is om die kompeterendheid van die industrie te verhoog, en indien wel, hoe dit bereik kan word. Die raamwerk wat gekies is om die doelstellings te bereik bestaan uit 'n kombinasie van Porter se *"Five Forces"* analise en *"Diamond Model"*.

Die resultate dui aan dat die industrie Suid-Afrikaanse perlemoen meer aktief moet bekendstel, individuele ondernemings meer in hul menslike hulpbronne moet investeer, en dat die industrie se vertroue in die nasionale regering herstel moet word, deur die dienste te verbeter wat deur publieke instellings soos die Suid-Afrikaanse Buro van Stanaarde (SABS), Departement Handel en Nywerheid en Mariene- en Kusbestuur verskaf word.

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CHAPTER ONE
INTRODUCTION

1.1 INTRODUCTION

Members of the genus *Haliotis*, commonly known as abalone, are distributed in the coastal waters of all continents (Evans and others 2001:1065). Many of the more than 70 recognised species (Mahoney, 2002) are harvested commercially or recreationally, forming a highly valuable marine resource. As the demand for the product continues to rise and methods for their capture are refined, the cultivation of many abalone species has been vastly developed. However, since abalone populations, like most highly priced marine resources, have come under increased legal and illegal harvesting pressures in the last three decades, some sea fisheries have experienced decline. This means that a higher demand for cultivated abalone could arise.

In the past two years, a substantial increase in the quantity of abalone produced by countries with established industries has indeed been recorded. At the same time, new entrants have made their debut. A large proportion of this production was in high value species such as *H. discus hannai* and *H. rufescens*.

South Africa competes in the global abalone market with several other countries. In 2001, world-renowned abalone experts, Roy Gordon and Peter Cook (2001:569), estimated that in 2004 the world abalone demand (excluding 'new-market' *H. supertexa*) would be 20 000 tonnes, while the world supply would only be 15 000 tonnes. This country's *H. midae* is of a very high standard and fetches a premium price on the market, which is sold in a niche market, where consumers are willing to pay a premium price for a superior product. The Japanese, *H. discus hannai* is, however, preferred to *H. midae.* While the demand for *H. discus hannai* currently exceeds its supply, a number of countries, such as Chile, Ireland and Hawaii, have also recently started to produce the species. When these countries together with Japan produce enough *H. discus hannai* to fully supply the demand, the price of *H. midae*, which is slightly less preferred, might be greatly reduced. South Africa's position in the international cultivated abalone arena might therefore not be wholly positive.

Before more resources are invested in the industry, therefore, research is necessary.

The primary aim of this study is to investigate the national competitive advantage of the South African abalone industry. According to Porter (1990a:75), *a nation's firms gain competitive advantage if they possess low-cost or uniquely high quality factors (of production) of the particular types that are significant to competition in a particular industry.* A further aim of the study is therefore to investigate the environment, in which the South-African abalone industry operates. Secondary aims include:

- to present a detailed description of the role-players in the South African abalone industry, and
- to consider whether the South African abalone industry can be made more competitive and, if so, how this can be achieved.

Identifying substitutes for South African abalone and thus searching for other products that can perform the same function fall outside the scope of the current study.

Ten of the abalone producers in South Africa are members of the Abalone Farmers Association of Southern Africa (AFASA). These producers were selected for the study. The first step in the research process was to have the study approved by the Chair of AFASA. After that, a set of semi-structured questions could be developed on the basis of the models in Chapter Two. These questions were used to structure the individual interviews with the producers. The data gathered from the interviews were analysed and interpreted, and recommendations followed.

1.2 THE CULTIVATED ABALONE INDUSTRY

The growing demand and rising price for first class abalone has shaped an economic environment in which the abalone marine-aquaculture (mariculture) has become increasingly attractive as a financial investment. The prime demand is in eastern countries, especially in China, Hong Kong, Taiwan, Japan and Singapore, where abalone is regarded as being number one of the four 'sea-treasures', which include abalone (representing health), sea cucumber

(representing wisdom), shark's fin (representing power) and fish bladder (representing the ability to survive) (Gosse, 2000:40).

In South Africa five endemic abalone species occur, two of which (*H. speciosa,* and *H. quecketti*) are extremely rare (Tarr, 2004; Geiger, 2004). Another two species occur, *H. spadicca* (the siffie, meaning 'little sieve') and *H. parva*, both of which are small species not exceeding 80 and 45 mm shell length respectively (Sales and Britz, 2001:864; Tarr, 2004). Of the five haliotid species that occur in South Africa, only *H. midae*, known locally as perlemoen, is of commercial significance.

Approximately 14 of the 70 recognised species in the world are used for mariculture. As mentioned above, the various species attain different prices in the market. Some species take longer to reach market size, while others are more liable to diseases. Certain natural resources also favour particular species over others. These factors influence a country's chance of success in the industry. In order to understand the international abalone arena better, one therefore needs a basic knowledge of the competing producer countries as well as the species they produce.

The 14 internationally farmed species, with their scientific and common names and the major producing countries are presented in Table 1.1. An in-depth study of the characteristics of the various species, the market demand for each and analyses of the total market demand fall outside the scope of the study.

Table 1.1 Commercially farmed Haliotis species

Species	Common name	Country	Source
H. asinina	Donkey's ear abalone	Australia, Korea, Thailand	Sawatpeera and others, 2001; Jackson and others, 2001; Sahaphong and others, 2001; Apisawetakan and others, 2001.
H. australis	Yellow foot abalone	New Zealand	Hone and Fleming, 1998; Kabir and others, 2001.

Species	Common name	Country	Source
H. corrugate	Yellow / Pink abalone	California	Chanpoo and others, 2001; Del Rìo-Portilla and Gonzalez-Aviles, 2001; Ma del Carmen Alvarez-Tinajero and others, 2001.
H. discus	Kuroawabi/ Disk abalone	China, Japan	Salvanes, 2001.
H. discus hannai	Yezo/ Ezoawabi	Chile, Hawaii, Ireland, Japan	Sasaki and Shepherd, 2001; He and Mai, 2001; Jia and Chen 2001.
H. diversicolor supertexa	Variously coloured abalone/ Tokobushi	China, Japan, Taiwan	Jia and Chen 2001; Ohlin, 1994.
H. fulgens	Green abalone	California, Chile	Serviere-Zaragoza and others, 2001; Searcy-Bernal and others, 2001; McBride and others, 2001;
H. iris	Blackfooted paua	New Zealand	Salvanes, 2001 Allen and others, 2001.
H. laevigata	Greenlip abalone	Australia, Tasmania	Hindrum and others, 2001 Shepherd and Rodda, 2001
H. midae	Perlemoen	South Africa	Shipton and Britz, 2001; Plaganyi and others, 2001; de Waal and Cook, 2001; Pitcher and others, 2001.
H. roei	Roe's abalone	Australia	Boarder and Shipgel, 2001
H. rubra	Blacklip abalone/ Ruber	Australia	Litaay and De Silva, 2001; Officer and others, 2001; Drew and others, 2001; Cummins and others, 2001.

Species	Common name	Country	Source
H. rufescens	Red abalone	California, Chile, Hawai, Mexico	Karpov and others, 2001; Tegner and others, 2001 McBride and others, 2001; Caceres-Martinez and Gissel, 2001.
H. tuberculata	Green ormer	France, United Kingdom	Avant, 2002; McBride and others, 2001.

1.2.1 History and current status of cultivated abalone

Mariculture of abalone began in China and Japan in the late 1950s and early 1960s (Gordon, 2000). After successful research on the mass production of seed, abalone farming quickly expanded in the 1990s. By 1999, total world production had reached about 18 000 tonnes, of which over 8 000 tonnes were farmed abalone (Gordon and Cook, 2001).

China's farmed production for 2002 was 6 000 tonnes, making China the world's largest abalone producer (Cook, 2002). Almost all of it is consumed internally. According to Hone and Fleming (1998:85), China is reaching the limits of new sites suitable for development and typhoons frequently cause extensive damage to the existing sites. Several cultivation sites in China have had to be abandoned because of excessive silt levels and fluctuating salinity (Department of fisheries: Western Australia, 2004). Although China predominantly produces *H. diversicolor supertexa* (Mahoney, 2002:6), they also produce *H. discus hannai* and *H. discus.*

Japan has many major farming operations, most of which are involved in ocean enhancement. Virtually all Japanese farming consists of ocean bottom growing from farmed seeds. Japan produces 25 to 30 million seeds per year (Mahoney, 2002:8). The species produced are *H. discus, H. discus hannai, H. diversicolor supertexa* and *H. gigantea.*

Abalone mariculture in California began in the 1960s. During the 1980s there were many entrants to the industry, several of which were research and

development companies that are now in commercial production (McBride, 1998:593). At present California has 21 registered mariculturists; six of which are productive abalone farms that have begun operations in the last five to seven years. The largest farm is currently selling approximately one million abalone per year and the smaller farms 50 000 or less. The farmed size of this abalone is normally 8.75 to 10 centimetres. In 1998 the total amount produced was approximately 356.4 tonnes (in-shell weight) of product valued at $2.4 million (Mahoney, 2002). *H. rufescens* comprises 95% of total production, followed by *H. fulgens* and *H. corrugata* (Mahoney, 2002).

In Taiwan, abalone mariculture is a well-established industry, dating back to the early 1970s. Production was initially on a very small scale and juvenile production and rearing methods were first developed in 1977. Taiwan currently has over 400 farms, many of which are small family run operations. The 1999 production was expected to exceed 1 500 metric tons (Mahoney, 2002). Today, total production is over 2 400 tons, making Taiwan the world's second largest producer. Most of the abalone is consumed domestically but part of the annual harvest is exported to Japan, Hong Kong and other markets. In March 2003, 800 tons of Taiwan's cultured abalone died, apparently owing to a virus brought in by abalone smuggled into the country. As a result of this virus, the price of the delicacy had dropped to NT$[1]400 from NT$600 per kilogram (Chiu Yu-Tzu, 2004). Taiwan produces *H. diversicolor supertexa*.

Abalone was first introduced to Chile in 1977; today they have 22 productive farms. Most of these farms belong to the salmon industry (Viana, 2002:34). Chile is an example of a country where abalone mariculture is growing at a very high rate. Their exports grew, for example, from 19 tons in 1999 to 48 tons in 2000. The majority of these exports were frozen. Revenue from exports increased from US$493 000 in 1999 to US$1.4 million in 2000. Prices also rose from an average of US$25.90/kg in 1999 to US$28.5/kg in 2000. However, the quantity of farmed abalone consumed in the home market, declined from 29 tons in 1999 to 9 tons in 2000 (Viana, 2002:34). This reduction can be attributed to the higher international price. Chile produces two varieties of abalone, *H. rufescens* and *H. discus hannai*, the first of which is the largest farmed species

[1] New Taiwan dollar

in the country. Godoy and Jerez point out that most of it is cultured with the in-water barrel system (Mahoney 2002). In order for Chile to succeed as one of the leading countries in abalone production, they need to face the problem of the overuse of antibiotics and subsequent bacterial resistance, as well as diatom management for post larvae production (Viana, 2002:34).

Mariculture of abalone in Australia and New Zealand began in the early 1980s (Hone and Fleming, 1998:83; Primary industries and Resources: South Australia 2004). Australian farmers usually grow abalone on land using tanks, troughs or raceway systems. Abalones are, however, sometimes also reared in barrels or sea cages hanging from buoys or rafts. Ocean ranching has been suggested as an alternative method of culture, but at present its economic viability still has to be proved. (Department of Fisheries: Western Australia 2003). Australian mariculture efforts mostly concentrate on the *H. laevigata* and *H. rubra species*. *H rubra* is preferred for cultivation since it has a faster growth rate (20-30 mm/year) than *H. laevigata* (15-25 mm/year) and a higher market price. In Western Australia, *H. Roei* shows promise, and its intertidal habitat indicates that it can tolerate a broad range of culture conditions. The tropical abalone, *H. asinina*, is also very appealing since preliminary growth trials have shown it to be one of the fastest growing abalone (>40 mm/year) in the world. *H. asinina* unfortunately sells for a lower wholesale price than warm temperate abalone (Hone and Fleming, 1998:83; Department of Fisheries: Western Australia, 2004). New ventures are proposed in Broome and Cairns using this species (Hone and Fleming, 1998:86). Australia's production for 2002 was only about 140 tonnes (Cook, 2002).

The New Zealand industry is still on a relatively small scale. Abalone farming techniques have been developing in New Zealand for some time and consequently several different methods for farming abalone have evolved, including in suspended containers at sea and in a variety of onshore tanks.

According to Jeffs (2004) 17 farms operate in New Zealand at present. The farms are spread around the country including Stewart Island, Coromandel Peninsula, Hauraki Gulf, Kaikoura, Marlborough, Canterbury and New Plymouth. Some interest has been expressed in farming New Zealand's yellow-foot abalone *H. australis*, but the larger *H. iris* is the main farmed species at

present. Significant commercial development of paua farming has been predicted with sales of both pearls and meat to reach NZ$62.5 million in a decade, from current sales of approximately NZ$400 000[2].

The *H. iris* shell is the most brightly coloured of all the worlds' abalones and is prised for making jewellery. Its black skin, however, greatly reduces the export market appeal of its meat, and are therefore mostly processed to remove the skin colour and then canned.

H. rufescens has been suggested for introduction to New Zealand waters specifically for mariculture. However, attempts to introduce this exotic species have failed and are unlikely to be successful in the near future (Jeffs, 2004).

In Mexico, commercial production began in 1993 (Abalones Cultivados, 2004). However, abalone farming activity has not grown in the past few years; no farms have appeared and only two private farms are still in operation. Both of these farms are now selling their product at a good profit margin (Viana, 2002:34). Mexico produces *H. rufescens*.

It is difficult to tell when Hawaii's commercial production began. In the report by Gordon and Cook (2001) mentioned earlier, no reference was made to Hawaii. Perhaps they did not consider Hawaii as a producer worth mentioning. In 2000, Big Island Abalone Company (BIAC) began with the construction of a farm designed to be the largest in the world outside of China. It is expected that their initial four hectare facility will reach full production in 2003, producing 100 tons. Of greater significance is the fact that they plan to expand production to a total of 24 hectares over the coming decade. This will raise production to about 1000 tonnes (Buchal, 2004). Hawaii produces *H. rufescens* and *H. discus hannai*.

1.2.2 The cultivated abalone market

The wholesale prices at the Tokyo Central Wholesale Market for December 2003 indicated that the Japanese are willing to pay the highest price for *H. discus hannai*, followed by *H. midae*, and *H. laevigata* and/or *H. rubra* from Australia, followed by *H. diversicolor supertexa* from Japan, followed by *H. diversicolor supertexa* from Taiwan. It can be assumed that species similar to

[2] NZ$400 000 was equal to approximately R1.87 million on 3 February 2004.

the less desired *H. diversicolor supertexa* (e.g. *H. asinina*) would achieve similar prices.

South Africa's competitive position in the international abalone arena is not only affected by the total supply-demand ratio of abalone, but even more by the supply-demand ratio of the more desired abalone species. While South Africa's farmers have chosen to farm only one species, the endemic *H. midae,* the country's failure to diversify its production to include other species, could possibly be the industry's single biggest shortcoming. Whether this decision was the correct one, however, goes beyond the scope of this study.

Table 1.2 Wholesale prices (price/kg) of live abalone at Tokyo central wholesale market (December 19-26, 2003)

Country of origin	Specie	Weight	Price in Yen (price/kg)	Price in US$ (price/kg)
Japan	H. discus hannai	Over 300 gm	10 000	94
		About 200 gm	9 000-8 500	85-80
		150-200 gm	8 500-8 000	80-75
		100-150 gm	8 000-7 000	75-66
	H. diversicolor supertexa		3 000-2 500	28-23
Australia			6 000-5 500	56-52
South Africa	H. midae		6 000-5 500	56-52
Taiwan	H. diversicolor supertexa		2 500-2 000	23-19

(Source: Southwest Regional Office: National Marine Fisheries Service)

It is important to make a distinction between the market for cultivated abalone and the wild product. As for most other countries, the wild product from Australia[3] has limited markets. It is restricted by minimum harvest size limits[4]. The mariculture product, in contrast, can be sold at any size. The world market for this kind of abalone is largely for live individuals in the size range 50-100 mm (Hone and Fleming, 1998). Known as 'cocktail abalone', the product has proved to be popular in Asian markets, which prefer whole portions. Cultured

3 Australia is the leading exporter of wild-caught abalone, contributing about 60% to world production (Litany and De Silva, 2001).

4 In the case of Australia the size ranges from 120-146 mm.

abalones are therefore an ideal size for an individual serving (Abalones Cultivados, 2004).

1.3 SOUTH AFRICA'S COASTAL RESOURCES

South Africa's coasts are a driving force in the national economy, and its products accounted for nearly 35% of the national Gross Domestic Product in the year 2000. Fisheries, agriculture, tourism and recreation, mineral resource exploitation and a variety of development prospects are only some of the social and economic opportunities offered by the coastal and marine resources. The Coastal Management Policy Programme (CMPP) initiated by the Ministry of Environmental Affairs and Tourism divided South Africa's coast into thirteen regions, each with unique characteristics. Three of the regions host members of AFASA, and will be explored in Chapter Five.

(Source: Tarr, 2004)

Figure 1.1 Perlemoen: the South African Abalone.

Illegal harvesting and the influence of the incursion of west coast rock lobster around Cape Hangklip dramatically reduced South Africa's wild abalone stocks. To salvage this valuable resource, government decided to implement a "focused management approach". This tactic is explained in the Department of Environmental Affairs and Tourism's 2003 policy for the allocation of

commercial fishing (Department of Environmental Affairs and Tourism, 2004b). According to the policy, no recreational abalone fishing is allowed and commercial abalone rights will only be allocated to divers, legal entities and abalone processing factories (see Chapter Five: 92). The lucrative nature of abalone trade indicates that even if commercial abalone fishery were closed completely, illegal harvesting for foreign markets will continue. To regulate international trade in H. Midae, Marine and Coastal Management consider listing abalone on Appendix III of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Such a listing would require all consignments of South African abalone to carry CITES documentation. Customs officials in importing countries would only allow shipments carrying CITES documentation to enter the country. This will allow other counties to support South Africa's anti-poaching efforts by ensuring the consignments they import are legal and have the appropriate documents. Although a listing for abalone would not ban trade in the species, its possible effect on the cultivated abalone industry are unclear (The Panda Organisation, 2004).

1.4 SEQUENCE OF CHAPTERS

Chapter Two provides a theoretical foundation of the study, where the factors influencing the competitive advantage of an industry are investigated at the hand of Porter's Five Forces framework (1980) and Diamond Model analyses (1990a).

Chapter Three provides an explanation on the methodology that will be used to gather the required data. The main method in this study was interviewing. In Chapters Four and Five the gathered data are presented and analysed. In Chapter Six a discussion of the preceding chapters are presented and then ways in which the South African abalone industry can be made more competitive are suggested.

CHAPTER TWO
COMPETITIVE ADVANTAGE OF AN INDUSTRY: THE PORTER APPROACH

"Porter - in all his writings - has his feet firmly planted within Industrial Economics or rather within the concept of "industry", i.e. he strongly believes in the structures of industry and the forces of competition. From this meso-level, he branches out to the micro or firm level and the macro or national and international level in his search for factors, forces, dimensions, etc. which influence and shape competition."

Olav Jull Sørensen 1996

2.1 INTRODUCTION

This chapter investigates Porter's views on competitiveness at the hand of both his Five Forces analysis and his Diamond Model. The Five Forces analysis is a tool for the appraisal of overall industry competition. It explores barriers to entry, rivalry, customer power, substitution and the power of suppliers. The Diamond Model in turn offers a framework for assessing the competitive advantages and disadvantages resulting from the locations where the firms are based. The model evaluates demand conditions, related and supporting industries, factor endowments, government, chance events, firm structure and strategy as well as local rivalry. Together, these two models offer a comprehensive tool for assessing the competitiveness of most industries.

The purpose of this chapter is to deliberate on the appropriateness of these models in the assessment of the competitiveness of the South African abalone industry. First, Porter's Five Forces model is explored, as offered in his 1980 volume, *Competitive Strategy: Techniques for Analysing Industries and Competitors.* Next, the views expressed in his 1990 volume, *The Competitive advantage of Nations* are critically analysed. Special attention is paid to the role of exchange and wage rates in competitiveness and the appropriateness of the diamond model in assessing non-triad, resource-based and export-orientated industries.

Section 4 offers a short overview of two applications of the Diamond Model in South African agribusiness, while Section 5 investigates the differences between

the Five Forces model and the later Diamond Model. The chapter concludes with the reasons why Porter's models are applicable for this study.

2.2 PORTER'S FIVE FORCES MODEL

Economists have long realized that supply and demand alone cannot explain why some industries are more competitive than others. As a result, Bain and Mason developed the Structure Conduct Performance model (S-C-M) to identify factors that allow economists to make descriptive and hopefully also predictive statements about industry competition (Makamson, 2004). The concern of the S-C-M is with industry performance in the context of the larger national economy. Data generated by the model provide information indicating what government intervention (if any) is necessary to improve industry performance in an attempt to improve the national economy.

Because the owners of an enterprise are primarily interested in the performance of their own business, the fairness of a competitive market does not really concern them (Makamson, 2003). The S-C-M could however not adequately provide information on how firms can influence or exploit particular characteristics of their industry in order to better themselves. This led to Porter's 1980 modification of the S-C-M into the Five Forces Model of Industry Analysis. As it explores factors such as barriers to entry, rivalry, substitution and the power of buyers and suppliers, this framework is better equipped to provide the data required by business strategists.

2.2.1 Overview of the five competitive forces

According to Porter (1980:3), the state of competition in an industry depends on the five basic competitive forces shown in Figure 2.1. Arguing that the collective strength of these forces determines the ultimate profit potential[1] in an industry, Porter says that, based on the information derived from the model, firms can decide how to influence or to exploit particular characteristics of their industry (Recklies, 2001).

[1] Porter describes 'profit potential' as the potential long run return on invested capital (Porter, 1980:3).

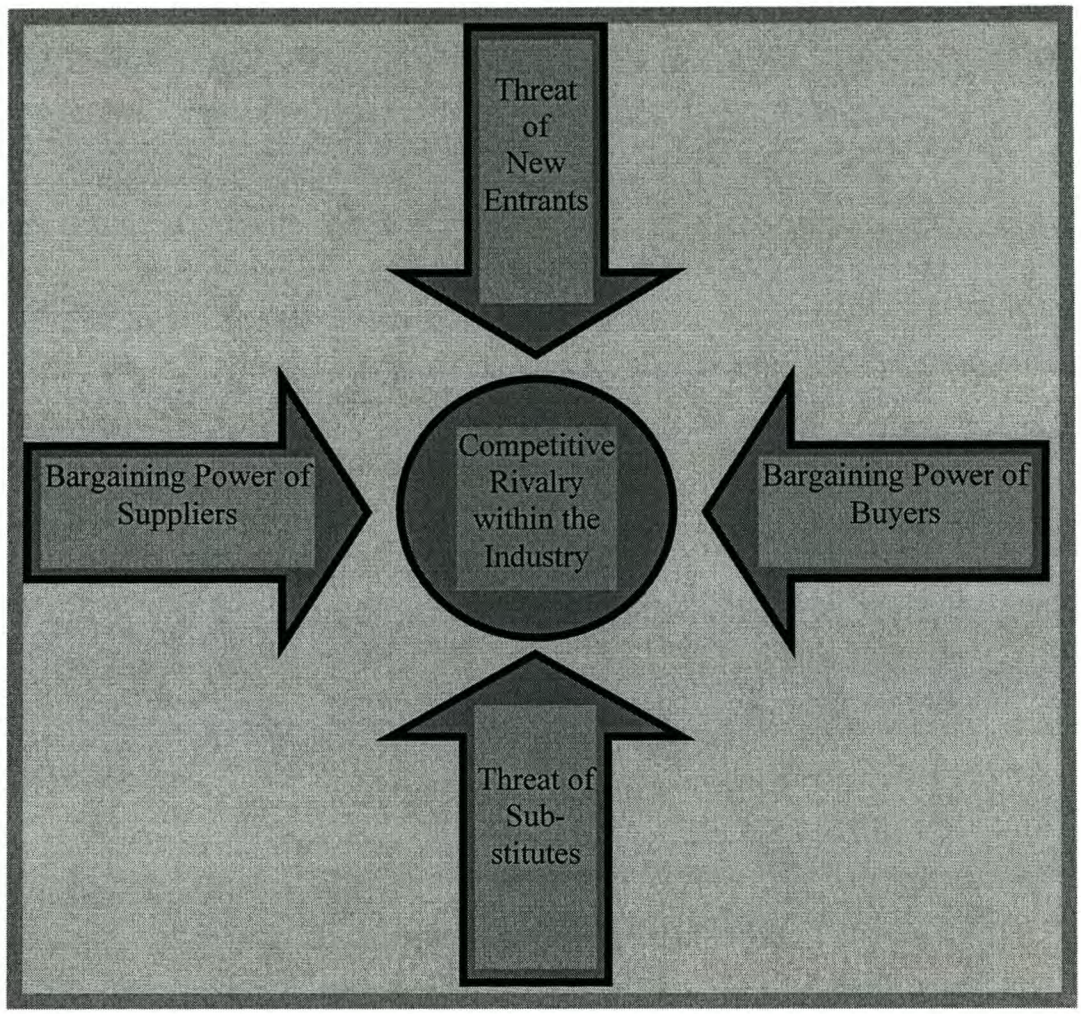

Figure 2.1 Porter's Five Forces Model

The reasoning behind the Five Forces model is that the competitive environment in an industry is shaped by the interaction of five relatively stable, but evolving forces. The forces are common to all industries but vary across them depending on the industry's economic and technological characteristics. The five competitive forces are as follows:

- **Rivalry among existing competitors**

Rivalry takes place because one or more of the competitors feels the pressure or sees the opportunity to improve a position (Porter, 1980:17). As an industry leader determines price and competition occurs on non-price factors, such as product differentiation (McDermid and others, 2002), the smaller the number and the larger the size of rivals, the less intense is rivalry. Intense rivalry is the result of a number of interacting structural factors, of which Porter (1980:18-20 and 2002) lists the following:

- *Numerous or equally balanced competitors*

- *Slow industry growth*
- *High fixed or storage costs*
- *Lack of differentiation or lack of switching costs (costs incurred by the buyer because he switched from one supplier to another)*
- *Capacity augmented in large increments, because where economies of scale command that capacity must be added in large increments, capacity addition can be extremely disruptive to the industry supply/demand balance*
- *Diverse competitors*
- *High corporate stakes, as a diversified firm could place great importance on achieving success in a particular industry to advance its overall corporate strategy*
- *High exit barriers, such as expensive and highly specialised fixed assets*
- *Brand identity*
- *Value added to the product*
- *Informational complexity (Also see Narula, 1993.)*

➧ **Threat of new entrants**

The easier it is for new enterprises to penetrate an industry, the harsher the competition will be. New entrants can change major determinants of the market environment, such as prices and customer loyalty, at any time. The threat of new entrants depends on the barriers to entry that are present in an industry. Porter (1980:7-15 and 2002) identifies the following barriers:

- *Economies of scale*
- *Proprietary product differences (Established firms usually have brand identification and customer loyalties, resulting from past promotions and customer service, or simply being first to enter the industry.)*
- *Capital requirements*
- *Switching costs*

- *Access to distribution channels (New firms must first persuade the existing distribution channels to accept their product through price breaks, cooperative advertising allowances, and so on, which reduce profits.)*
- *Government policy (Government can limit or shut out entry into an industry by introducing measures such as licensing requirements and limits on access to raw materials.)*
- *Proprietary product technology (Product know-how and design characteristics kept secret from competitors.)*
- *Favourable access to raw materials (Established enterprises may already have the finest sources of raw materials. These enterprises could possibly have 'tied up' foreseeable needs early at prices reflecting a lower demand.)*
- *Favourable locations*
- *Government subsidies (Preferential government treatment, for example subsidies, can give established firms long-term advantages in some industries.)*
- *Learning or experience curve (The mastery of technology so that it can be employed in an efficient manner takes time. In this regard also see Narula (1993).)*
- *Expected retaliation (The potential entrant's expectation of existing competitors can serve as a barrier to entry.)*

➧ **Bargaining power of buyers**

Their bargaining power is how much pressure customers can place on a business. If one customer has a large enough impact to have an effect on a company's margins and volumes, then he or she holds substantial power. Porter (1980, 24-26) distinguishes between two categories of factors to explain why buyers might have power:

- Bargaining leverage
  - *Buyer firms are relatively more concentrated than supplying firms*
  - *Buyers purchase large volumes relative to seller sales*

- *Buyer switching costs are low relative to firm switching costs*
- *The buyer has full information*
- *Buyers pose a credible threat of backward integration, that is, they are able to expand their activities to include activities upstream in the value chain*
- *The buyer can purchase substitute products.*

- Price sensitivity
  - *The products buyers purchase from the industry represents a significant portion of their costs of purchases*
  - *The products buyers purchase from the industry are standard or undifferentiated*
  - *Brand identity*
  - *The industry's product is unimportant to the quality of the buyers' products or services*
  - Buyers earn low profits

➧ **Bargaining power of suppliers**

The term 'suppliers' include all sources of inputs required to provide goods or services. The bargaining power of suppliers is how much pressure they can place on a business. As in the case of buyers, if one supplier has a large enough impact to affect a company's margins and volumes, then he or she holds substantial power. Porter (1980:27-28) identifies the following reasons why suppliers might have power:

- *There are very few suppliers of a particular product.*
- *The industry purchases only a small amount of the suppliers' total products.*
- *The product is very important to the buyer and no real substitutes exist.*
- *The supplier group's products are differentiated or have built up high switching costs.*

- *The supplying industry has a higher profitability than the buying industry.*
- *Suppliers are able to expand their activities to include activities downstream in the value chain, that is, forward integration is possible.*

➧ **Threat of substitutes**

According to Porter (1980:23), the pressures of substitutes can be summarised as the industry's overall elasticity of demand. Identifying substitute products involves searching for other products that can perform the same function as the product of the industry.

2.2.2 Use of information provided by Five Forces model

Although the Five Forces model may initially appear rather simple, once the information it requires has been gathered, it seems to provide valuable information on the current and potential future state of the business environment. Managers, who use this information in their search for opportunities to manipulate these forces in their firm's best interest, may reduce the power of the competitive forces.

2.3 PORTER'S DIAMOND OF COMPETITIVE ADVANTAGE

Porter (1990a) developed the diamond model in his volume, *The Competitive Advantage of Nations.* As the title suggests, the volume is meant to be a contemporary equivalent of Adam Smith's *The Wealth of Nations* (Moon and others, 1998). This connection with Smith's opus greatly contributed to the controversy as well as the success of Porter's book, the title of which was therefore an excellent choice. However, Metcalfe (1990:131) suggests that a more appropriate title might have been '*The Competitive Advantage of Industries'*. As Porter himself argues, "*Firms, not nations, compete in international markets*" (Porter, 1990a:33). In the study of international trade, Hodgetts (1993:44) therefore proposes that Porter's model must be applied in terms of company-specific considerations and not national advantages.

In this book, Porter criticises existing explanations of the international competitive position of industries, which emphasise the importance of the comparative advantage of nations with respect to factors of production. He sees

the increasing international mobility of these factors as leading to 'fleeting advantages'. More importantly, a role for firm strategy is absent in the existing explanations. Instead, the behaviour of firms must become integral to a theory of national competitive advantage. The central question to be answered is therefore why "*firms based in particular nations achieve international success in distinct segments and industries*" (Porter, 1990a: 19).

To answer this question, Porter develops his Diamond Model to measure the competitiveness of a country's industries, which has been evaluated extensively. A brief summary of these criticisms follows.

2.3.1 Determinants of national competitive advantage

To explain why "*some social groups, economic institutions and nations advance and prosper*", Porter (1990a: xi) focuses on four country-specific determinants of the 'diamond' that individually and together determine national competitive advantage. While the diamond is the key to the Porter hypothesis, allowance is also made for two additional variables: 'chance' and 'government'. These two outside forces also have an effect on competitiveness, but are not seen as direct determinants.

- **Factor conditions**

Factor endowments form the basis of the traditional theory of international comparative advantage. Porter, however, analyses the characteristics of factors of production, the process by which they are created, and their relationship to a firm's competitiveness in much greater detail. He distinguishes between 'basic factors' and 'advanced factors'; and between 'generalised factors', which could be deployed in a wide range of industries, and 'specialised factors', which cannot. Basic factors that he mentions include natural resources, climate, location, unskilled and semi-skilled labour and debt capital, whereas advanced factors include a modern digital data communications infrastructure, highly educated personnel such as graduate engineers and computer scientist, and university research institutions in sophisticated disciplines (Porter 1990a:77-78). Generalised factors consist of things such as the highway system, a supply of debt capital, or a pool of talented university graduates in the field, while specialised factors are more narrowly skilled personnel, an infrastructure with

specific properties, knowledge bases in particular fields, and other factors relevant to a limited range or even just to a single industry.

Finally, Porter poses that the abundance or low cost of a factor often leads to its inefficient deployment, whilst disadvantages in basic factors, such as labour shortages, lack of domestic raw material, or a harsh climate, create pressures on firms to innovate (Porter, 1990a: 82).

- **Demand conditions**

Three conditions of home demand that are particularly significant to achieving competitive advantage are mentioned by Porter (1990a:89-91). First, a nation's industries must have an advantage in global segments that represent a significant part of home demand, but account for a less significant share in other nations. Second, sophisticated and demanding buyers in the home base must pressure local firms to meet high standards. Third, the needs of home buyers must anticipate those of other nations. Porter sees the competitive advantage that these conditions provide not as dependent on the size of the market as it is on the extent to which the market encourages firms to innovate.

- **Related and supporting industries**

The third determinant of national advantage in an industry is the presence in the nation of supplier industries or related industries that are internationally competitive (Porter, 1990a: 100). The existence of internationally competitive supplier industries generate advantages in downstream industries by way of swift access to cost effective inputs, whereas internationally competitive related industries permit firms to co-ordinate and share activities in the value chain. The conditions that create successful industry clusters are said to grow out of the operation of the determinants of competitive advantage in various ways. For example, if one competitive industry is a sophisticated and demanding customer for the products of its suppliers, it creates domestic demand conditions that will help to develop and sustain competitive advantage among the supplier industries. Two or more industries may also be related in so far as they require the same type of factor conditions, such as specialised labour skills. If they are based in the same location, they can have the effect of developing and strengthening the common pool of labour skills through training and on the job experience. In this way, each of the industries benefits from the general

strengthening of factor conditions. By such means the industries are linked to each other in ways that mutually reinforce the competitive advantage of each industry concerned (O'Malley and Van Egeraat, 2000:58).

- **Firm strategy, structure and rivalry**

The fourth broad determinant of national competitive advantage in an industry is the context in which the firms are created, organised or managed, as well as the nature of domestic rivalry (Porter, 1990a:107). Arguing that "*nations will tend to succeed in industries where the management practices and modes of organisation are well suited to the industries' sources of competitive advantage*", Porter (1990a:108) indicates that important differences in management practices occur in areas such as training, background and orientation of leaders, group versus hierarchical style, the strength of individual initiative, the tools for decision making and the nature of the relationship with customers.

He therefore views domestic rivalry as the most important drive to innovation and consequently success in international competition as "*one domestic rival's success signals or proves to others that advancement is possible*" (Porter, 1990a: 119) and concludes that competitive pressures amongst domestic firms force an industry to seek more advanced and ultimately more sustainable sources of competitive advantage.

- **Chance**

The role of chance as caused by developments such as new inventions, breakthrough technology, external political shocks, wars, oil shocks, significant changes in world financial markets and major shifts in foreign market demand. As mentioned before, chance events do not form part of the diamond itself, but can affect competitiveness by affecting the corners of the diamond.

- **Government**

Porter understands the various roles of government to include subsidies, education policies, actions toward capital markets, the establishment of local product standards and regulations, the purchase of goods and services, tax laws and other activities.

2.3.2 Porter's aim and findings

According to Porter (1990b: 190), the aim of his work was to challenge the conventional view that competitiveness in knowledge-intensive industries is determined by exchange rates, capital costs, cheap labour, abundant natural resources and economies of scale. Instead he found that:

- *"Innovation and upgrading – or dynamism – is critical to competitive advantage.*
- *Pressure and challenges are the underpinnings of innovation and upgrading; provided that the nation has the requested specialised knowledge and human resources and that the goals of companies and individuals support sustained development.*
- *Active local competition, demanding home customers, and pressures to use resources efficiently support competitive advantage.*
- *Diverse competitive approaches, duplicative R&D efforts, and local diffusion of technology accelerate rather than detract from, the process of innovation."*

2.3.3 Comments and criticisms

Commentators and supporters have found different grounds on which to damn or praise Porter, but their views were as much a reflection of their own background as the richness of their subject (Daves and Ellis, 2001:1193). The purpose of this section is to assess these views, and to draw conclusions on the merit of Porter's aims and findings.

Very few of Porter's critics commented on the aim of his study. The comments were mostly directed at the role of exchange rates and cheap labour as determinants of competitiveness. In assessing these two factors, the section will first investigate some of Porter's statements in his 1990 volume. This is followed by the analysis of two articles in which Porter's views are criticised. This part of the section concludes with a description on how the role of exchange and wage rates will be assessed in the current study.

➧ Wage and exchange rates

To facilitate the assessment of Porter's aims, we need to understand what he meant by 'competitiveness'. Where he tries to clarify the term (Porter 1990a:6), he recommends that we abandon the notion of a 'competitive nation' because it does not have much meaning for economic wealth. The principal goal of a nation should rather be a high and rising standard of living for its inhabitants. This can only be obtained by increasing productivity, which is the value of output produced by a unit of labour or capital. "*[T]he only meaningful concept of competitiveness at the national level is [therefore] national productivity*" (Porter, 1990a:6).

After examining this explanation, one would expect Porter to provide comparative data for wages, price levels or cost levels in the countries he studied. As noted by Daly (1993:121), however, Porter did not provide any of this information. This is not an accidental omission, as Porter argues that wage rates or exchange rates are irrelevant in the study of competitiveness.

First, he states "*managing industry wage rates is irrelevant in industries where labour content is small"* (Porter, 1990a: 16). Daly (1993:121) criticises this statement, as Porter did not take into account the labour content in related and supporting industries. However, since Porter's statement was made in light of his assumption that factor comparative advantage does not explain the international competitiveness of most industries, this criticism is invalid.

In a statement that is often misinterpreted, Porter (1990a: 128) argues that even though government actions to hold down the value of a nation's currency, appears desirable if factor costs are seen as the dominant determinant of international success, such actions result in a long term loss of competitive advantage. Market pressures and the resulting innovations, he says, can overcome factor costs. The undervaluation of a currency, on the other hand, slows down the upgrading of competitive advantages and lead firms to compete in unsustainable price-sensitive market segments. "*Lowering the exchange rate and in doing so removing pressures on firms to improve and upgrade is counterproductive*" (Porter, 1990a: 128). Most economists would agree with this argument that the pressures resulting from a strong exchange rate must spur firms to innovate and to compete in sustainable markets where price-

competition is less significant. Later Porter (1990a: 618) claims that balancing trade and/or forcing down the value of the currency in order to boost competitiveness are inappropriate goals. The expectation of a lower exchange rate leads firms toward a dependence on price-sensitive segments and industries, whilst an exchange rate that rises steadily, reflecting normal market forces is most likely to encourage upgrading (Porter, 1990a: 642).

Porter (1990a: 640-642) also criticises the role of fiscal and monetary policy to influence wage levels and exchange rates as they "*are based on an incomplete view of the determinants of competitive advantage and of the process of upgrading that determine economic prosperity*". Wages should be allowed to rise with or slightly ahead of productivity growths, as this creates beneficial pressures to seek more advanced sources of competitive advantage and compete in more sophisticated industries and segments.

Porter (1990a: 352) illustrates this argument by assessing the competitiveness of Swedish industries. He criticises the Swedish government for using devaluation as a prime policy tool, as it indicates an overly macroeconomic view of competitiveness. He admits that this approach might have been a short-term solution, but argues that it worked against the long-term dynamism of Swedish firms. The same applies to Sweden's attempts to hold down factor costs artificially.

However, by using updated data on unit labour costs for the countries Porter studied, Daly was able to demonstrate that changes in the country rankings cannot be explained by Porter's Diamond Model. Changes in unit labour costs and exchange rates were however highly correlated with changes in country rankings. Questioning the capacity of Porter's Diamond Model as a predictive instrument, Daly therefore suggests that macroeconomic factors could be more important than the four microeconomic elements in the diamond. Clarifying the term 'competitiveness' and showing how it can be measured, he (Daly 1993:120) identifies three ideas from economics as relevant to competitiveness: efficiency, economy and effectiveness, which he defines as follows:

- *"Efficiency is the extent to which high output is achieved from a given combination of inputs, such as labour, capital (and perhaps purchased materials and services);*

- *Economy is the degree to which a given product (or group of products) can be produced at low costs per unit; and*
- *Effectiveness is the degree to which the production process or the product produced by a country (and the companies in it) corresponds to longer-term shifts in technology and/or market demand*".

Although Daly praises Porter for recognising efficiency and effectiveness, he criticises him for under-emphasising the criterion of economy and thus underplaying the relative costs of producing similar products in different countries. He justifies this allegation by clarifying the role of wage rates on market share and explaining that if a country had a low level of unit labour costs that reflect the combined effects of compensation per hour, real output per hour and the exchange rate, it would gain world market share. This would lead to high profits in the producing as well as the related and supporting industries, after which industries would revise their strategies to take advantage of these factors, he argues. In contrast, high unit labour costs would be reflected in lower profits, loss in market share, and so forth.

Daly's investigation on the unit labour costs[2] of six of the countries[3] studied in the Porter volume enabled him to compare the data so obtained with Porter's data on gains and losses in world market shares for individual countries. The results indicated that there is a strong connection between unit labour costs and world market share[4], with a result that he considers Porter's hypothesis that wage rates and exchange rates do not influence competitive advantage inconsistent, not only with his own data for countries, but also for his time period. With this, Porter might well agree, as he clearly explains that his argument holds for long-term competitiveness (Porter, 1990a:352).

The importance of grasping the concept 'competitiveness' is also emphasised by Eilon (1992). However, he chooses to use one of Porter's own explanations: "*To achieve competitive success, firms from the nation must possess a competitive advantage in the form of either lower costs or differentiated products that*

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2 The data on unit labour costs were for the years 1977, 1980 and 1984. Porter's data were for the period 1976 to 1985.

[3] Namely Japan, United States, Germany, Italy, Sweden and the United Kingdom

[4]The correlation coefficient between levels of unit labour costs and the ratio of share gains to share losses was 0.869 for all six countries common to both studies of competitiveness (Daly, 1993:122)

command premium prices." (Porter, 1990a: 10). This highlights four important aspects of competitiveness (Eilon, 1992: iv):

- *"If comparable products are available from competitors, then competitiveness is only dependent on the enterprise's ability to reduce unit cost.*
- *If the products of competitors are not comparable, then competitiveness is enhanced by product differentiation.*
- *Product differentiation is a means by which management may seek to lighten competitive pressure on unit cost.*
- *Trying to achieve premium prices by product differentiation can only succeed up to a point, beyond which the unit cost cannot be ignored".*

Eilon make use of these aspects to argue that Porter's exhortations about low wages and low exchange rates are often undeservedly criticised. He acknowledges that low wages and low exchange rates are important in reducing or controlling the level of unit costs, so that particular products which are (currently) undifferentiated in export markets, or cannot be made sufficiently differentiated, continue to remain competitive (Eilon, 1992:iv). Realising, however, that many of Porter's critics do not fully grasp the concept of 'product differentiation', Eilon then provides an elaborate explanation of the term. According to Eilon, product differentiation is not confined to product design and functional specifications. Product differentiation also includes several other attributes, for instance quality and reliability, prompt supply, after-sales service and terms of trade. Virtually all products can therefore be differentiated. It is only in the brief period before product differentiation that unit costs are the prime factor determining competitiveness. The competitive advantage brought about by low wages and exchange rates are therefore soon eroded. Eilon therefore agrees with Porter's notion that low wages and exchange rates hold the danger of over-protecting enterprises and consequently keeping them from becoming more efficient. This suggests that enterprises must take drastic action during periods of low wages and exchange rates to become more productive, and/or to create product differentiation.

The arguments by Porter, Daly and Eilon all deserve credit. Porter was correct in reasoning that strong exchange and wage rates should spur firms to seek more

advanced sources of competitive advantage and compete in more sophisticated industries and segments. Eilon agrees and advises enterprises to take drastic action during periods of low rates to become more productive, and/or to create product differentiation. He does however warn that attempting to achieve premium prices by product differentiation can only succeed up to a point, beyond which the unit cost cannot be ignored. This statement is in line with Daly's evidence, which shows that changes in exchange and wage rates are highly correlated with changes in the competitiveness of countries.

It would therefore seem that exchange and wage rates do influence the competitiveness of a country's industries. For the purpose of this study, exchange rates are considered in respect of their ability to spur firms to seek more advanced sources of competitive advantage. The role of wage rates is not assessed here.

- **Relevance of the modifications to the Porter model**

To some extent, Porter's commentators do agree that the diamond theory integrates the most important variables determining a nation's competitiveness into one model. As noted by Moon and others (1998:136), most preceding models designed for this purpose represent only subsets of Porter's comprehensive model. However, although the Diamond Model is instructive and provides a useful means to analyse competitive advantage, the somewhat vague conclusions are based on information that has been analysed in a manner that may be regarded as subjective (Narula, 1993:86). While they may all be legitimate, their relevance are very limited as the model is specified as a home-base model of international competitiveness (Dunning, 1993; Rugman and D'Cruz, 1993; Rugman and Verbeke, 1993; Cartwright, 1993). To be in a position to make more distinct conclusions, Porter's critics have modified his model.

The first notable modification was made by Dunning. In a 1990/91 article, he criticises Porter for not recognising the influence of two-way foreign direct investment (FDI) (Cartwright, 1993:67; Rugman and D'Cruz, 1993:24). The methodology used by Porter permits the examination of only exports and outward FDI. Inward FDI and imports of foreign-owned subsidiaries are ignored. To solve this problem, Dunning adds multinational activity as a third

outside variable. This extended model is referred to as the Porter-Dunning model (Cartwright, 1993:67). Since inward FDI and imports of foreign-owned subsidiaries do not play a role in the South African abalone industry, Dunning's modification is irrelevant in the current study.

As Narula (1993), Cartwright (1993) and Rugman and D'Cruz' (1993) all agree that two-way foreign direct investment and multinational business activity affect a country's international competitiveness, they further modified the Porter-Dunning model. In addition, Narula (1993) criticises the Porter-Dunning model for not addressing technology adequately. Because it consists of scientific knowledge of processes and products, as well as knowledge of the market and its structure, technology is something so complex that it can only be accumulated over time. Even though the acquisition and sale of technology can be an instant process, however, mastery that enables employees to use it in an efficient manner often takes a long time. Narula (1993) therefore introduces technology and the process of its accumulation as an additional endogenous variable in the Porter-Dunning model.

This factor may indeed have a significant effect on the competitiveness of the South African abalone industry. Although the Diamond Model does not allow for its evaluation, however, the Five Forces model does. Narula's modification is therefore irrelevant to the current study.

After testing the Porter Diamond Model with data from resource-based and export-dependent industries, Cartwright (1993:65) concludes that his results "*cast considerable doubts on the ability of the Porter diamond theory to predict or prescribe the characteristics of internationally competitive industries that are resource based and export dependent*". Since Porter's theory claims that the international success of a nation's industries depends on determinants located in the domestic environment, competitive advantages following continuous innovation of factors and synergistic linkages with related industries resulting from demand conditions and rivalry faced by firms through their offshore activities are ignored.

This omission leads to Cartwright (1993: 66) to extend the Porter-Dunning model to include the following offshore variables:

- *"Capture of advanced factor creation capability offshore.*

- *Linkages to related and supporting industries offshore.*
- *Sophistication and discernment of offshore customers.*
- *Rivalry offshore.*
- *Orientation of firm's international goals, and structures towards capturing offshore sources of competitive advantage."*

Interpretation of the results of the Cartwright's extended model suggests that the following six variables most strongly determine international competitiveness and discriminate best between competitive and less competitive performances (Cartwright, 1993:68-69):

- *"Strength of rivalry in offshore markets.*
- *Coordination of export activities to achieve economies of scale and scope and to ensure sufficient bargaining power in foreign markets.*
- *Close working relationship within discerning offshore customers.*
- *Capture of capabilities for advanced factor creation offshore.*
- *Commitment of firms to goals and structures to support international strategy, as distinct from home-base activities.*
- *Efficient, quality-conscious, and responsive production in the home-base, with continues innovation in the upstream value chain."*

Since the first two variables can be assessed by means of the Five Forces model and the remaining four can be addressed by the variable "firm strategy, structure and rivalry" in the Diamond Model, the modifications by Cartwright are avoidable in the current study.

Rugman and D'Cruz (1993) criticise the data used to build Porter's model. They argue that the ten countries that supplied statistical analysis of aggregate data on export shares on which the model was constructed (Denmark, Italy, Japan, Singapore, South Korea, Sweden, Switzerland, the United Kingdom, the United States, and West Germany) are all industrialised countries. Since most countries of the world do not have the same economic strength or affluence as those studied by Porter, it is highly unlikely that an unmodified Porter model can be applied to them (Hodgetts, 1993). Both Rugman and D'Cruz (1993) and

Hodgetts[5] (1993) therefore argue that although Porter's single Diamond Model might work for large triad economies it needs to be adapted for smaller countries. However, Rugman and D'Cruz (1993) demonstrate that the model could not even adequately explain Canada's successful resource-based multinationals, their foreign subsidiaries or their access to the triad market of the United States through the Free Trade Agreement. To better facilitate the global competitiveness of Canadian industries, they proposed that Porter's model be transformed into a 'double diamond' framework (Figure 2.2), which they referred to as the North American diamond.

This framework illustrates how Canadian firms that engage in international competition in the United States[6] must take into account United States demand conditions, production factors, and extended rivalry, to the same extent as Canadian diamond characteristics (Rugman and Verbeke, 1993:78).

The North American diamond involves (Rugman and D'Cruz 1993:33):

- *"developing innovative new products and services that simultaneously meet the needs of U.S. and Canadian customers, recognising that close relationships with demanding U.S. customers should be used to set the pace and style of product development;*
- *drawing on the support industries and infrastructure of both the U.S. and Canadian diamonds, realising that the U.S. diamond is likely to possess deeper and more efficient markets for such industries; and*
- *making free and full use of the physical and human resources in both countries."*

Since all of the above issues can be addressed by the 'firm structure, strategy and rivalry' determinant of the diamond framework, the modifications proposed by Rugman and D'Cruz (1993) are not needed in the investigation of the South African abalone industry.

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[5] Hodgetts did not modify the model himself, but chose to use Rugman and D'Cruz's double diamond framework in his assessment of Mexico's competitiveness.

[6] The United States is Canada's biggest trading partner.

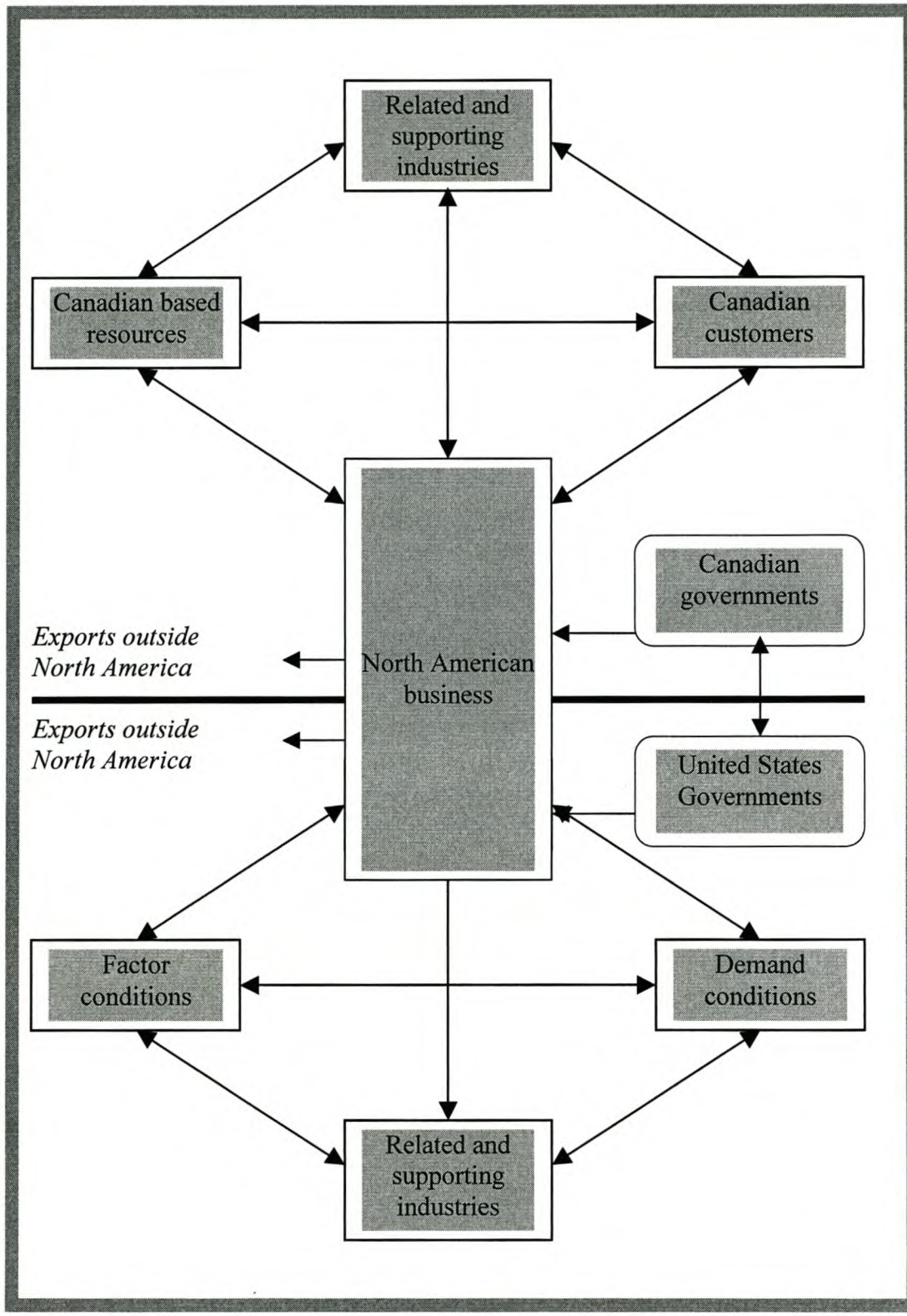


Figure 2.2 Double (North American) diamond model

The double diamond framework was modified, in turn, by Moon and others (1995) into the 'generalised double diamond'. Like Hodgetts (1993) and Rugman and D'Cruz (1993), they too feel that Porter's single home-based diamond is only relevant for larger triad economies. This new model formally incorporates

multinational activity in order to better assess the competitiveness of smaller countries. This approach involves the analysis of both the home diamond of the small country and the diamond of its largest trading and investment partner. The framework was applied to Canada, South Korea and Singapore (Moon and others, 1995, 1998). After testing the validity of the model, they concluded that their results generally support their model.

They consider the generalised double diamond to be an improvement of Porter's framework as it takes into account that small countries target resources and markets in both a domestic and global context. They say that a nation's competitiveness depends partly upon its own domestic diamond and partly upon the 'international' diamond relevant to its firms.

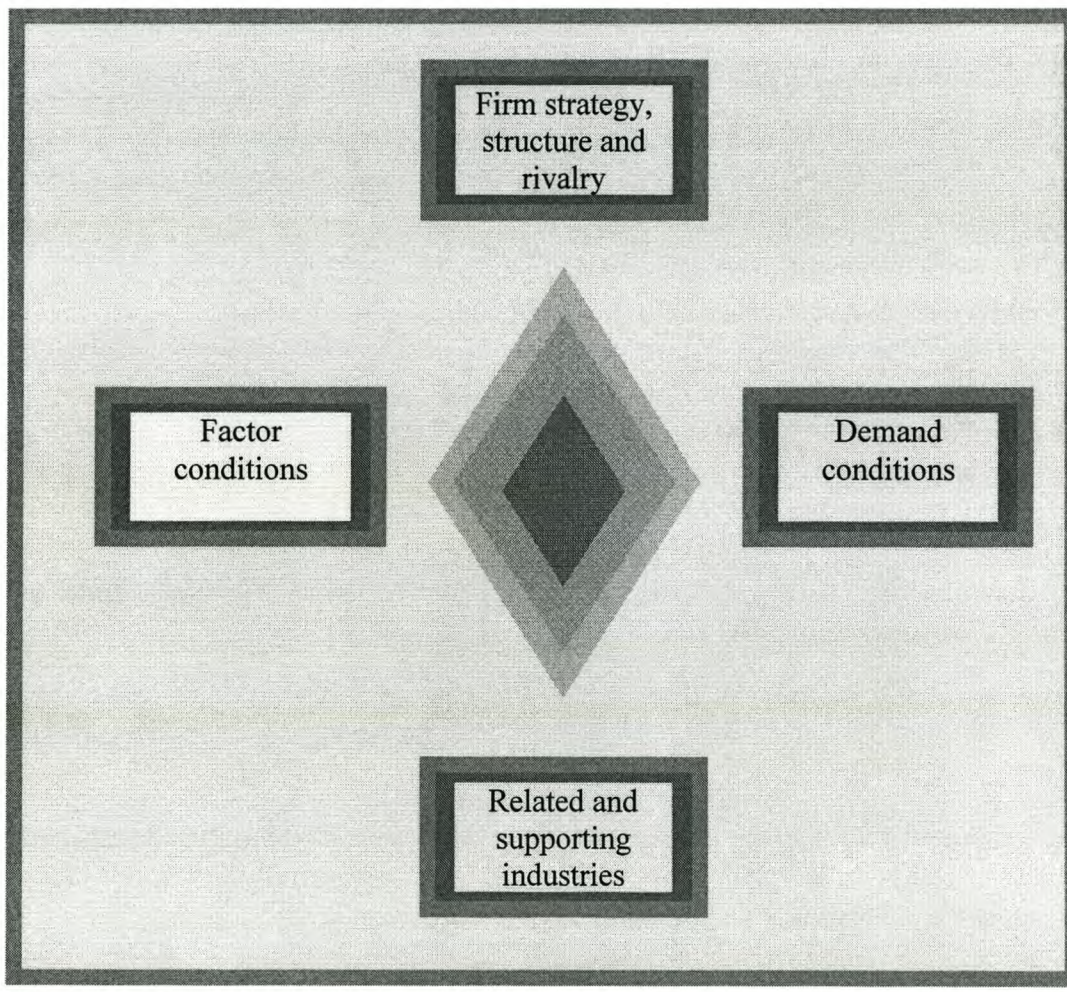


Figure 2.3 The generalised double diamond

Figure 2.3 illustrates the generalised double diamond where the outer diamond indicates a global diamond and the inner one a domestic diamond. The size of the domestic diamond varies according to the country size and its

competitiveness, but the size of the global diamond is fixed within a foreseeable period. The diamond in between is an international diamond, which represents the nation's competitiveness as determined by home-based and foreign-based factors. Multinational (international) activities are represented by the difference between the international and the domestic diamonds. These consist of both outbound and inbound foreign direct investment. The authors (Moon and others, 1998:138-139) specify that for the use of the generalised double diamond model, national competitiveness refers to "*the capability of firms engaged in value added activities in a specific industry in a particular country to sustain this value added over long periods of time in spite of international competition*" and point out the following two methodological differences between Porter's model and the generalised double diamond model:

- *"The generalised double diamond take into consideration that sustainable value added in a specific country may result from both domestically owned and foreign owned firms. The Porter model does not assimilate foreign activities.*
- *The generalised double diamond, unlike Porter's single home-base diamond acknowledge that sustainability may require a geographic configuration spanning many countries, whereby firm specific and location advantages present in several nations may complement each other."*

The generalised double diamond framework requires a vast amount of data. Since all the firms in the South African abalone industry are domestically owned, many of the data fall outside the scope of the current study. The Porter model is consequently preferred to the generalised double diamond model.

From this analysis, it appears that none of the modifications made by Porter's critics are relevant in the assessment of the South African abalone industry. The diamond framework as proposed by Porter (1990a) is therefore used in the assessment of the competitive advantages and disadvantages that result from the locations where the various abalone farms are based.

2.3.4 Applications in South African agribusiness

In a thesis entitled *Nasionale mededingende voordeel: Die Suid-Afrikaanse Appelbedryf*[7], an "expanded" Diamond Model (Figure 2.4) was employed to compare the Chilean apple industry with the South African apple industry on the basis of Porter's four internal determinants of competitive advantage (Du Toit, 2000). Du Toit's assessment of firm strategy in the South African industry contains a synopsis of South Africa's macro-economic policy since 1970, strategies followed by producers and marketers, as well as product development and technology transfer. Firm structure was reviewed by means of a short profile of the average producer. An overview of apple producer organisations is also provided. Domestic rivalry is referred to briefly. Information on factor costs (setup and production; transport, storage and packaging; international trade and shipping) and comparisons between the income and costs of South African and Chilean producers form the basis of the evaluation of factor conditions. An impression of South Africa's natural resources (location, climate, soil, and water) and infrastructure (road and port network, storage facilities), as well as some views on the roles of exchange rates, is also offered.

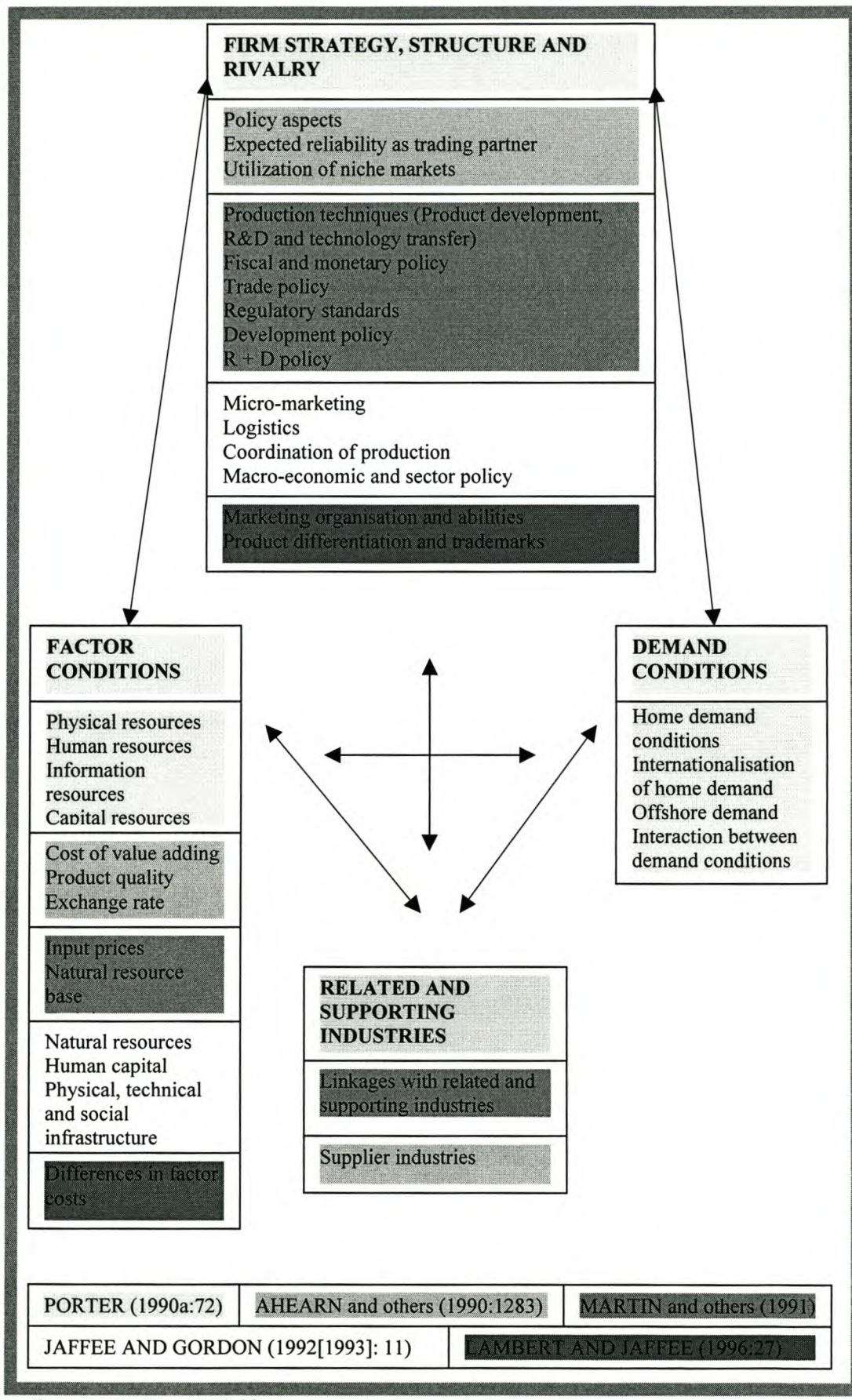
In the assessment of directly related and supporting industries, the export volumes of apples and apple-related products (dried apples, apple concentrate) are compared. The assessment of indirect industries consists of two short paragraphs in which Du Toit claims that healthy rivalry exists in the packaging industry. The appraisal of home demand conditions involves statistics on the quantity of apples sold in South Africa, but Du Toit notes that local consumer preferences are seldom transferred to offshore markets.

The primary aim of that study was to analyse the national competitive advantage (as defined by Porter, 1990a:75) of the South African apple industry.

Secondary aims of Du Toit's dissertation that relate to this study include:

- the analysis of the home base of South Africa's biggest rival in terms of production and marketing of fresh apples, namely Chile;
- a simultaneous report on the home bases of the two countries;

[7] National competitive advantage: The South African Apple industry



(Source: Du Toit, 2000:28)

Figure 2.4 Expansions as illustrated by Du Toit

- determining the effect of the history of the various countries on their apple industries; and
- a discussion on how the home bases influenced the achievement of international trade success in the fresh apples market.

Du Toit found that the home bases of the two countries he studied differ to a great extent, and that both are extremely complex. These differences often have a direct influence on the trade success of the countries. He concludes that when the two industries are assessed using Porter's diamond, it would appear as if Chile's national competitive advantage exceeds that of South Africa. This phenomenon he partially ascribes to the efforts of Chile's government to create an environment in which economic growth is facilitated, concluding that the direction of South Africa's competitive advantage will in future depend primarily on the way in which government influences the home base in which the apple industry operates.

In an attempt to identify and analyse the factors that influence the competitiveness of the South African agri-food and fibre complex, Esterhuizen and others (2001) also make use of the diamond approach to competitiveness analysis. Their primary data were obtained through a postal survey at firm level. Questionnaires were posted to all the members of the Agricultural Business Chamber (ABC) and to agribusinesses on an address list obtained from the South African Grain Information Services. A total of four hundred questionnaires were posted, seventy of which were returned.

The research assessed the perceptions of industry leaders on issues influencing competitiveness. The aim of that study was to point out strengths and weaknesses and to identify critical strategic factors on which firms have to focus in order to develop and sustain a competitive advantage.

Table 2.1 lists the fifteen most important factors influencing the competitive success of the agro-food industry as determined by these researchers. Their results indicate that the quality of products (i.e. value for money) had the most important impact on the competitive success of the firms participating in the survey. Respectively 84.38% and 83.08% of the respondents indicated labour policy and crime as very important factors in the competitive success of the agro-food industry.

Other factors that were indicated by the respondents to play a very important role for competitive success are the market power of buyers, managerial capabilities, the cost and availability of capital, the cost of skilled labour and the cost of production.

Table 2.1 The fifteen most important factors influencing the competitive success of the agro-food industry (Esterhuizen and others, 2001)

Factors	Very important (%)	Important (%)	Less important (%)
1. Quality of products	86.15	10.77	3.08
2. Labour policy	84.38	12.50	3.13
3. Crime	83.08	12.31	4.62
4. Managerial capabilities	76.19	22.22	1.59
5. Market power of buyers	78.13	17.19	4.69
6. Local market growth	75.38	21.54	3.08
7. Cost of capital	78.13	14.06	7.81
8. Local economic stability	72.31	24.62	3.08
9. Cost of production	71.43	22.22	6.35
10. Availability of capital	69.23	26.15	4.62
11. Competitiveness of suppliers	66.13	32.26	1.61
12. Quality of physical infrastructure	66.15	29.23	4.62
13. Sustainability of suppliers	63.93	32.79	3.28
14. Pricing strategy of companies	65.08	30.16	4.76
15. The cost of skilled labour	64.06	31.25	4.69

Factors over which agribusinesses has relatively little control are identified as externally manipulated factors such as labour regulations, crime, the quality of physical infrastructure and labour costs. Product quality, cost of production, managerial capacity and labour skills, on the other hand, can to a large degree be controlled by firms. These operational aspects that firms can control they recommend should be the focus of firm level strategy.

While Du Toit's use of Porter's model does not provide any new information that could be relevant for this study, the fifteen factors identified by Esterhuizen and others have been used in the interviews with representatives of the cultivated abalone industry in this study to determine the factors that might influence competitiveness in this industry.

2.4 MOTIVATION FOR USING PORTER'S FRAMEWORKS IN THE CURRENT STUDY

There are two key differences between the Five Forces framework and the Diamond Model. The first difference is in the appraisal of rivals and entry barriers in the industry. According to the Five Forces framework, intense rivalry makes an industry unattractive. In the Diamond Model intense rivalry is a positive attribute as it stimulates firms to become more competitive.

In the Diamond Model, rivalry is seen as an important drive to innovation and consequently success in international business. While at a single point in time a firm might prefer less rivalry, over the long run more local rivalry is better, since it puts pressure on firms to innovate and improve. In an address, Porter (1990c) proclaimed that high local rivalry results in less global rivalry, which means that intense rivalry is a positive attribute that contributes to the international competitiveness of an industry.

The second difference between the Five Forces framework and the Diamond Model concerns the relationship of the firm with its buyers and suppliers. The Five Forces model advocates an antagonistic relationship, while the Diamond Model suggests a cooperative affiliation. In Porter's older work, he argues that to reduce the power of competitive forces managers have to manipulate the bargaining power of buyers and suppliers in their firm's best interest. Buyer/supplier relations are thus seen as antagonistic and competitive, instead

of cooperative. The model suggests that firms should be willing to abandon existing buyers/suppliers readily in order to switch to new ones. According to McDermid and others (2002), this adversarial rather than cooperative view of buyers/suppliers is a fundamental difference between the Five Forces and the later Diamond Model, when Porter stresses the importance of creating competitive industry clusters.

Clusters represent an alternative way of organizing the value chain that can be positioned somewhere between arm's length markets on the one hand and hierarchies, or vertical integration, on the other. Compared with market transactions among dispersed and random buyers and sellers, the proximity of firms in clusters and the repeated exchanges between them fosters communication, coordination, innovation, and trust (De Witt, 2004). Since persistent switching between buyers and suppliers will destroy the trust relations essential to the existence of competitive industry clusters, De Witt (2004) argues that the creation of a competitive industry cluster demands cooperative relationships between the firm, its buyers and suppliers.

A further difference between Porter's two models lies in the function of the models. While the Five Forces analysis is a tool for the appraisal of overall industry competition, the Diamond Model, offers a framework for assessing the competitive advantages and disadvantages resulting from the locations where the firms are based.

As mentioned in chapter one, the goal of this study is to provide a detailed description of the role-players in the South African abalone industry, and to determine how it can be made more competitive. The achievement of these aims requires a framework to establish which data is necessary for this task. For the reasons mentioned above, the framework selected for this study, involves a combination of Porter's older and newer models. How this is done, is described in Chapter Three.

CHAPTER THREE
METHODOLOGY

3.1 INTRODUCTION

According to Porter's Five Forces framework the state of competition in an industry depends on the rivalry within the industry, the possibility of new entrants into the industry, bargaining power of buyers and suppliers and the threat of substitutes. The collective strength of all these forces, except the 'threat of substitutes' (see Chapter One), determines the potential long-run return on capital invested in the abalone industry and is therefore important in this study. As shown in Chapter Two, the Five Forces framework, nonetheless, has its limitations. Since it does not make allowances for the assessment of firm structure and strategy or factor endowments, buyer and supplier industries are the only related industries evaluated, while government can only be assessed as a supplier of either products or services. An analysis of the abalone industry that uses only the Five Forces framework would thus be incomplete.

Since the Diamond Model contains such determinants as factor conditions, related and supporting industries, firm strategy, structure and rivalry, government, the role of chance events and home demand, the first five of which are a perfect remedy for the shortcomings of the Five Forces framework, it is an excellent 'supplement' to the latter model for this study. Because the role of home demand is currently a hot subject in the abalone industry, it will also be examined.

A thorough assessment of the competitiveness of the industry necessitates a good understanding, description and analysis of the various role players. The researcher needs to consider not only the opinion of the representatives, but also how the individuals in the industry are linked and how people interact. This technique provides a framework in which the opinions, perceptions and attitudes of the various role players can be captured and compared. It illustrates the flow of information and resources, identifying cracks in the system.

Section 3.2 of this chapter describes the design of the study. The aims of the study are restated and the methods of data collection are explained. Special

attention is paid to the advantages of using standardised open-ended interviews in the collection of qualitative data.

Techniques to keep interviewees talking for an extended period of time without leading them are discussed in Section 3.3. A short profile of the participants in the study, and the reasons for selecting them, is presented in Section 3.4. Section 3.5 provides the step-by-step procedure employed in the data collection process as well as information on the format of the interviews. Possible limitations of the data collection procedure are offered in Section 3.6. Section 3.7 demonstrates how the data analysis plan of action provides data directly responsive to the research questions. Section 3.8 describe the abalone cultivation firms that were examined in the study. The chapter concludes with section 3.9, offering a short overview of the preceding eight sections.

3.2. DESIGN OF THE STUDY

As stated in Chapter One, the primary aim of the study is to investigate the national competitive advantage of the South African cultivated abalone industry. The data gathered can be employed to point out problems shared by the various members of the Abalone Farmers Association of Southern Africa (AFASA). A secondary aim is to present a detailed description of the role players in the industry. To add breadth and depth to the examination, a holistic approach of inquiry involving the use of both qualitative and quantitative methods of data collection was used.

Qualitative methods permit the researcher to study selected issues in depth and detail, as the data collection is not constrained by predetermined categories of analysis. It can give intricate details of phenomena that are difficult to convey with quantitative methods (Strauss and Corbin, 1990:19). The advantage of the qualitative approach is that it produces a wealth of detailed data about a small number of people. Quantitative methods, on the other hand, entail the use of a standardized approach so that the opinions of the participants are limited to certain predetermined response categories. They allow researchers to measure the reactions of the subjects to a limited set of questions, however, thus facilitating comparison and statistical aggregation of the data (Patton, 1990:165).

In the current study, the dominant paradigm employed was a qualitative approach. According to Patton (1990:280) there are three general approaches to collecting qualitative data through open-ended interviews:

- informal conversational interviewing,
- general interview guide approach, and
- standardised open-ended interviewing.

The difference between these three approaches is in the extent to which the interview questions are standardised. *Informal conversational interviewing* relies entirely on the spontaneity of the interviewer and interviewee and is typically an interview that forms part of ongoing field research. The data collected from these types of interviews can vary greatly. The *general interview guide approach* involves outlining a set of issues that are to be explored during the course of the interview. Both parties are allowed some flexibility on how and where the interview might go. The interview guide merely serves as a basic checklist during the interview to ensure that all relevant topics are covered. In *standardised open-ended interviewing,* a set of carefully worded and arranged questions is asked. This creates less spontaneity within the interview, but is said to provide for more consistent topics of discussion among participants.

The *general interview guide approach* was chosen for the study as it combined the advantages of the other two methods identified by Patton (1990) and concurred with the researcher's objectives. As for standardised data collection methods, advantages of this method are higher response rates and improved data quality. Interviewers are able to help respondents understand the questions and provide correct answers, thereby allowing for the collection of more complex data. While the quality of the data might not be as controlled as in standardised interviews, the data obtained require less editing and correction at a later stage than informal conversational interviewing would.

The data were collected by means of face-to-face interviews involving the entire population, which were followed up by e-mail. One disadvantage of this method is that face-to-face interviews are expensive. The time and transport to reach the respondents involve costs. However, the size of the population in this study is so small, that the problem was not insurmountable.

3.3 CONDUCTING THE INTERVIEW

An important part of conducting an interview is being able to keep interviewees talking for an extended period of time without leading them. If all information is freely volunteered, some assurance is provided against the pre-determination of answers by the questions asked. The effect to aim for is a "content-free" question, which Dick (1998) argues is more effective if the interviewer has been able to develop and maintain good rapport. He identifies the following methods in which "content-free" questions can be asked:

- The so-called pregnant pause, where the interviewer smiles kindly and says nothing. This method can be very effective when used in moderation. Overdoing it will however discomfort both the interviewer and interviewee.
- Friendly, encouraging, yet non-committal noises such as "mmm?", "uh-huh?" and related gestures, for instance smiles and nods. If overused, these noises and gestures can also easily provoke discomfort.
- Asking for more specific information, such as: "When last did that happen?"
- Repeating back a key word or phrase, or the last word or phrase, with a questioning intonation: "Strike?"
- Returning to earlier business that was passed over at the time: "You mentioned..."

In this study, all these techniques were practiced and used. However, the interviews proved to be much less problematic than anticipated, since all the respondents were friendly and co-operative.

3.4 PARTICIPANTS

One of the strengths of qualitative analysis is the holistic exploration of the unit of analysis. When a group or association is the unit of analysis, qualitative methods involving opinions and profiles can focus directly on the unit.

As members of the Abalone Federation of South Africa (AFASA), these ten interviewees represent eleven of the abalone farms in South Africa. There are ten interviewees, because one firm owns two farms and has only one

representative. The notion underlying the study was that this group of well-informed, experience-rich persons, interviewed individually, would be the best source of data necessary to complete the study.

Table 3.1 Participants in the study

Company	Representative
Premier Fishing	James Lawson-Smith
Aquafarm Development	Jacques Du Plessis
Global Ocean Holdings	Brynn Simpson
Abagold	Pierre Hugo
HIK Abalone	Roger Krohn
Irvin & Johnson (I & J) Dangerpoint	Nick Loubser
Jacobsbaai Sea Products	Cecilia Viljoen
Sea Plant Products	Gustav Groenewald
West Coast Abalone	Dennis Whyte
Marine Growers	Connie Muller

3.5 PROCEDURE IN DATA COLLECTION

The first step in the information gathering process was to meet Mr Nick Loubser, Chair of AFASA, who agreed to send out an e-mail to all the members of the Association informing them about the proposed study and requesting their views on it. Once a favourable response had been received, the researcher was invited to present the project at the AFASA meeting held on 19 June 2003. The purpose of the presentation was to describe the proposed industry survey and to ensure the members that all sensitive data gathered would be treated confidentially.

Soon after approval of the project, the ten participants in this study were interviewed. The average interview took approximately an hour. Most of the interviews were done in Afrikaans with a few conducted in English. Nine of the interviews took place on the farms in the office of the firm representative. The tenth interview took place in the office of the managing director of the firm, which is not on the farm.

The interviews were conducted in three parts. A section of the first part was confidential as it contained questions requiring sensitive financial information. The part consisted of guided semi structured questions developed on the basis of the model described in Chapter Two. The questions were used to shape the individual interviews with the representatives of the ten firms. It was tape-recorded and responses were transcribed for the purpose of data analysis.

In the second part of the interview, the representatives were asked to give a short written description of their farms. An example of the desired information and format was provided. The aim was to obtain a detailed description of the various role players.

In the third and final part of the interview, the participants were provided with a list consisting of fifteen factors, which, according to Esterhuizen and others (2001), are the prime factors that influence the competitive success of South Africa's agro-food and fibre complex. The participants were asked to rate these factors as less important, important or very important. The aim of this part was to determine whether the factors that influenced other sectors were also significant in the cultivated abalone industry.

3.6 LIMITATIONS OF THE DATA COLLECTION PROCEDURE

Since only one representative represented each farm, it was decided that when a representative could not provide all the desired information as the subject of the question fell outside their area of expertise, the representative would be asked to obtain the required information from a colleague and send it to the researcher by e-mail. In all, however, this happened only once.

3.7. DATA ANALYSIS

The key issue in data analysis is that of appropriacy. The purpose of this section is therefore to demonstrate how the data analysis strategy will provide information that is directly responsive to the research questions. The data gathered should be analysed in a way that permits the researcher to assess the competitiveness of the South African abalone industry, and to point out problems shared by the various members of AFASA. The data gathered in the qualitative part of the interviews have therefore been analysed in accordance with both the Five Forces framework and the Diamond Model.

Due to the rather low number of participants in the study, advanced statistical procedures was unnecessary. Therefore, to analyze the data from the quantitative questions, and determine the general trends, descriptive statistics have been used.

A secondary aim of the study is to present a detailed description of the role players in the industry. A short description of the various farms, as provided by the farm representatives, has therefore been employed to provide the information required to achieve this aim.

3.8 DESCRIPTION OF THE FIRMS EXAMINED IN THE STUDY

Behind the success of **Abagold** lies the pioneering research and breeding efforts, which began in Hermanus Old Harbour in 1984. Hermanus Abalone (Pty) Ltd. the precursor of Abagold was established in 1995 and by 1999 the new venture sold its first 100kg of abalone. In 2002 the name was officially changed to Abagold (Pty) Ltd. At present the first farm, Sea View, produces 70 tons per annum. Developing the second farm, Bergsig, will increase production to 240 tons per annum by 2004 (Abagold, 2004).

"***Aquafarm Development (Pty) Ltd***. *was established in 1995. The farm has its own hatchery, packing and grow-out facility that is producing 65tons of abalone per annum. We pride ourselves on having a "sabellid-free" farm which ensures strong, fast-growing abalone which is perfectly suited for the live market. It was one of the very first farms to export cultured abalone on a commercial basis and those strong marketing contacts were maintained and today we are marketing abalone on behalf of three farms and sold over 200 tons in 2002 and an estimated 300 tons is forecast for 2004 (Du Plessis, 2003)".*

The **Global Ocean Group** had its beginnings in the mid 1990's when a group of investors and researchers established an abalone culturing facility in Harbour Road, Kleinmond, on the south coast of South Africa. The two main operational units are Fishbay Mariculture - specialising in juvenile abalone culture and mariculture techniques and Global Ocean Marine Technologies (Maritek) - focused on technology development (tanks, water delivery, filtration, etc) (Global Ocean, 2003).

*"**HIK** was established in 1997. We are involved in producing a quality product for the Asian market. We have a hatchery and grow-out that is capable of producing 120 to 150 tons of abalone. We pioneered the use of plastic PVC tanks which are being used more and more in the industry. We have also developed our own stock control database and use a computerised grading system which insures accuracy of export weights and stock assessment (Krohn, 2003)."*

*"**I&J** built their farm at Danger Point (Gansbaai) in 1994 after an extensive research period of four years. The farm has its own hatchery and grow out facilities. The abalone is fed on natural feed harvested from the wild and cultivated at the farm. In order to maintain the highest possible standard I&J has its own in-house research and development facility to continuously improve production and product quality management techniques. I&J exports most of its products live to the far East with some canning and other value adding products are being developed. Nick Loubser, the manager of the farm, has been involved with the farm from its research and inception days (Loubser, 2003)."*

*"**Jacobsbaai Sea Products** started as an abalone farm in 1995, has a nursery and on growing facility, and is capable of producing 50 tons per annum. Kelp has been used as feed since the beginning (the natural approach). On of the goals of the business is to have a successful integrated poly-culture system (shellfish, finfish, algae). We are getting our water from a sheltered recreational bay, as a rule not really affected by harmful algal blooms (Viljoen, 2003)."*

***"Marine Growers** produce the only slightly red abalone in the country. We feed a natural food that makes our abalone very strong to survive in tanks at the end user. Our farm started in 1991 without any help whatsoever from any government department and although there were difficult times we are still surviving (Muller, 2003)."*

*"**Atlantic Fishing Abalone** farm is a division of Premier Fishing, a black empowerment company. The farm was started in 1991 and is situated in an old quarry site on the outskirts of the Gansbaai harbour. The farm has come on line fairly recently and is producing about 30 tons of cultivated abalone annually. The farm is currently being further developed and will be looking at increasing its capacity to 80 tons annually. The farm makes use of a flow through system*

and has a unique supply of water in that the pumps are situated below sea level (Lawson – Smith, 2003)".

*"**Sea Plant Products Abalone** farm (a subsidiary of Marine Products) are involved in all aspects of farming, including spat production, grow-out, feed manufacture and processing. Quality products for the Far East markets are export live, canned or frozen. The farm is capable of producing 80 tons per annum and will be develop to be capable of producing 200 tons per annum. (Groenewald, 2003)."*

*"**West Coast Abalone** was established in 1998 on our site in Stompneusbaai. The directors are Dennis and Karen Whyte and Jens Heinberg. The farm is an integrated nursery and grow-out facility. Our first export sales were in 2001 and by 2004 we should reach our targeted 50 tons per annum. The toxic PSP red tide is an ever-present threat on this side of the Coast. It was initially believed that abalones were not affected by PSP but this has since been proved to the contrary (Whyte, 2003)."*

3.9 SUMMARY

The aim of this chapter was to give an overview of the methodology used by the researcher in a way that can be replicated without difficulty. The data used for the study was descriptive, as this category of data suits the research question best. To serve as a background to the competitiveness analysis, the description of the firms has been provided in this chapter.

Considering that only eleven abalone farms are registered as members of AFASA, the researcher chose to have individual interviews with one representative of each farm. Contrary to expectation, most representatives could provide all the desired information.

Chapters Four and Five contain the analysis of the data.

CHAPTER FOUR
A FIVE FORCES ANALYSIS OF THE SOUTH AFRICAN CULTIVATED ABALONE INDUSTRY

4.1 INTRODUCTION

This chapter examines the South African cultivated abalone industry in terms of Porter's five forces analysis. As mentioned before, the five forces analysis is a tool for the appraisal of overall industry competition. It can be used to explore rivalry among existing competitors, the threat of new entrants into the industry, the bargaining power of buyers and suppliers, as well as the threat of substitute products. The aim of the chapter is to determine the ultimate profit potential of the South African cultivated abalone industry. Based on the information derived from the model, firms can decide how to influence or to exploit particular characteristics of their industry.

4.2 RIVALRY AMONG EXISTING COMPETITORS

Intense rivalry is the result of a number of interacting structural factors. The data obtained in this study is discussed below in terms of the factors listed by Porter (1980:18-20; 2002), which may affect the South African cultivated abalone industry. According to Porter all the factors increase rivalry in the industry.

4.2.1 Numerous or equally balanced competitors

Eleven of the abalone farms in South Africa are represented at AFASA. Two of them, Bergsig and Seaview, belong to the same company. Since their staff work for both farms, they are analysed as a single unit for the purpose of this study.

The number of personnel employed at the farms and the amount of fixed capital invested can serve as indicators of the extent to which the abalone farms are equally balanced. The range for personnel employed (see Figure 4.1) at the different firms is between seventeen and 110. The average number of personnel at an abalone firm in South Africa is therefore nearly 70. The total number employed on all the farms is 555. In the light of Porter's emphasis on equal

balance among competitors, the great variance in number of personnel could indicate a low level of rivalry.

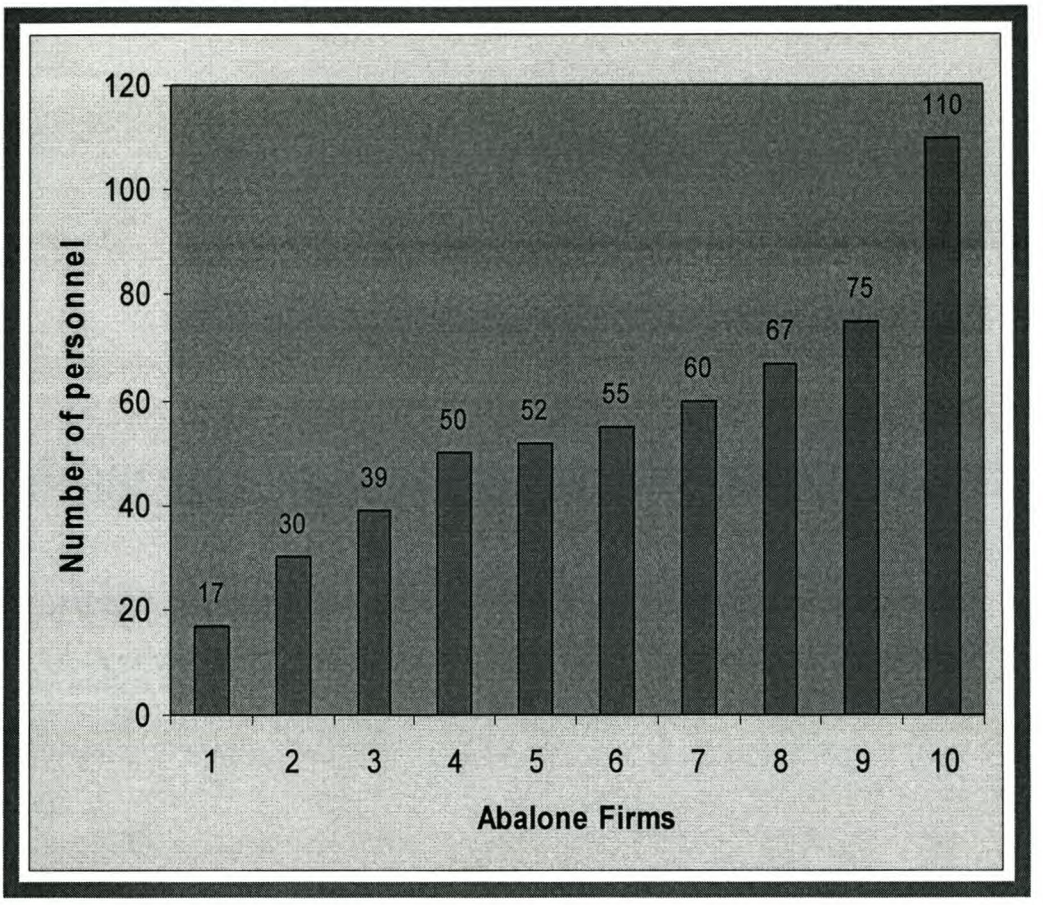


Figure 4.1 Number of personnel employed at the various firms

Excluding land, the fixed capital invested (see Figure 4.2) by eight of the ten firms ranges between R1.6 million and R30 million. (The values for the remaining two firms were not made available by the various respondents.) If the two firms that have the lowest and the one that has the highest fixed capital invested are seen as outliers, the figures show that most firms invested between R15 million and R20 million on fixed capital. This would make the variation in fixed capital much smaller than the variation in the number of personnel employed, which, in turn, would suggest that the competitors are more or less equally balanced. According to Porter, this interpretation should indicate severe rivalry. However, if the outliers are taken into consideration, the competitors cannot be seen as equally balanced. In this case, little rivalry can be expected.

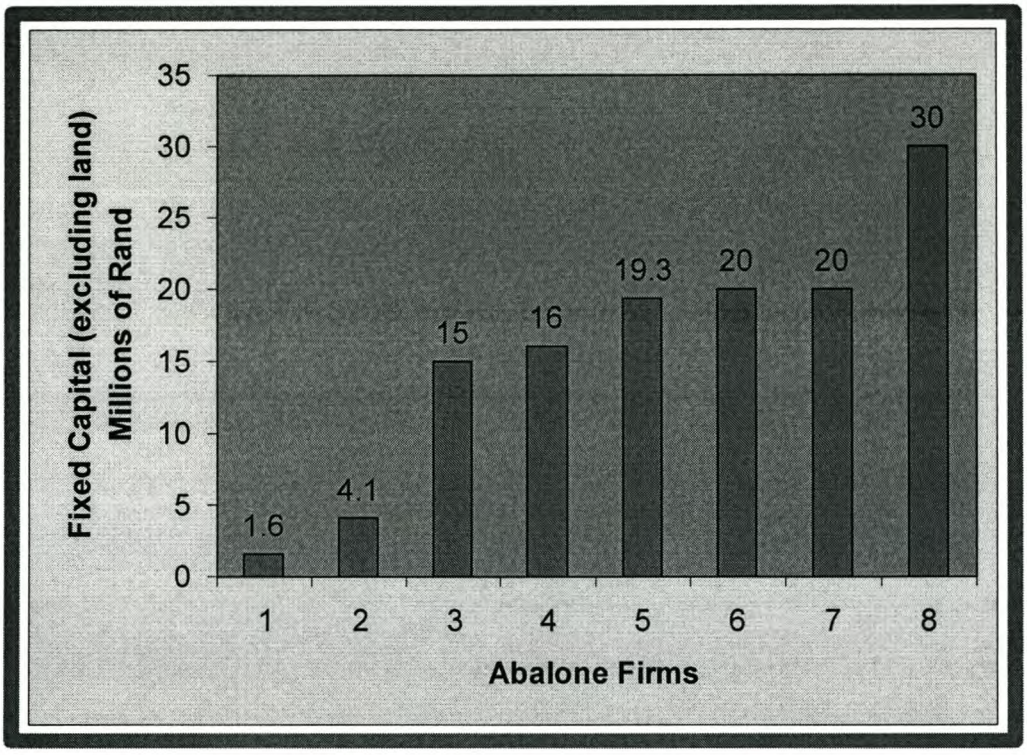


Figure 4.2 **Fixed capital (millions of Rand) invested on the farms by eight of the ten firms**

4.2.2 High corporate stakes

According to Porter (1980:20), a diversified firm could place great importance on achieving success in a particular industry to advance its overall corporate strategy. It would appear however that this is not the case in the South African cultivated abalone industry. According to the data obtained in this study, the back-up companies are not likely to invest in a farm until they are a hundred percent sure that they will get the return on the money that they anticipate, that is, a rate higher than the return on savings. This would limit rivalry.

4.2.3 High fixed or storage costs

Fixed costs, such as the cost of renting property, are those costs that do not change when the quantity of the output produced changes. By and large, these costs are not very high at abalone firms. At this moment in time, demand far exceeds supply, as a result storage costs are very low. Porter would see these low costs as an indication of low rivalry.

4.2.4 High exit barriers

The fixed assets on the abalone farms are highly specialised and very expensive, which means that the enterprises cannot easily change. This could increase rivalry.

4.2.5 Slow industry growth

The tonnage produced in 2000 and 2002 (see Figure 4.3) provides an indication of the rate at which the industry grows. The total production in 2000 was 201 tons and in 2002 519 tons. That is an increase of nearly 260 percent for the two-year period. This fast growth could indicate a low level of rivalry.

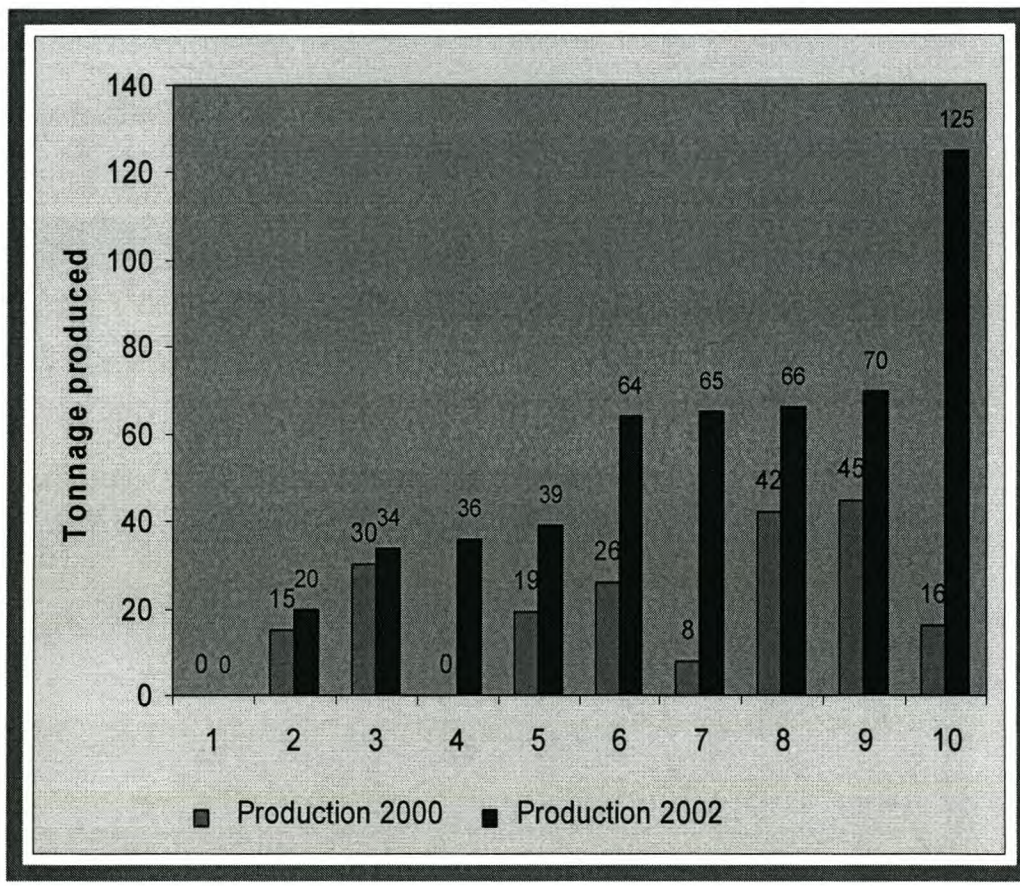


Figure 4.3 Tonnage of abalone produced in 2000 and 2002

4.2.6 Lack of differentiation or lack of switching costs

Since the farm-representatives responded in the interviews that their clients put a great value on the trust relationship built between them and the producers from whom they buy, and the building of a trust relationship generally takes many years, buyers would incur high switching costs. This indicates a low level of rivalry.

4.2.7 Capacity augmented in large increments

Economies of scale command that capacity must be added in large increments. Several of the representatives said that they are able to substantially increase their output without significantly increasing their running costs. What is more, is that these representatives often already have hatcheries and grow-out facilities capable of producing such large quantities. Expansion is also seen as a method to contend with low exchange rates. It is therefore difficult to estimate the abalone production for years to come. If the projection of the various representatives is anything to go by, one could expect that capacity will be augmented in sizeable increments for as long as the market is able to absorb the additional supply. This indicates a high level of rivalry.

4.2.8 Value added to the product

The percentages of total product sold live, canned, frozen and semi-cooked are shown in Table 4.1. Seventy-two percent of the abalone is sold live at first point of sale. At present it seems as though the ex-farm price of processed abalone is lower than the ex-farm price of live abalone for all the firms examined. As processing practices improve and the difference in ex-farm prices decreases, a decrease in the percentage of abalone exported live can be expected, because exporting abalone in processed form will reduce some of the logistical problems faced by abalone producers. These problems include packing the abalone at night, getting space on aircrafts, and aircraft not being able to transport the abalone because the temperatures inside them are not controlled.

If value added increases, rivalry will also increase, according to Porter.

4.2.9 Diverse competitors

South African cultivated abalone firms supply their product to the market in four basic forms: live, canned, frozen and semi-cooked. All farms sell live abalone, seven farms sell canned abalone, eight farms sell frozen abalone and one sells semi-cooked abalone. Seventy-two percent of all South-African abalone is sold live at first point of sale[1], 16.5% is sold in cans, 10.5% is sold frozen and the remaining 1% consists of semi-cooked exports.

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[1] Some farms sell their live abalone to other farms. The other farms then resell the abalone as live, frozen or canned.

The percentage of the total production of abalone sold live by individual firms ranges between 50% and 100% percent, the canned abalone sold ranges between 0% and 33% and the percentage sold frozen ranges between 0% and 23%. Semi-cooked abalone, which is only sold by one firm, makes-up 1% of the firm's total products. The competitors have therefore diversified, which is seen as an indication of high rivalry.

Table 4.1 Percentage of total production sold live, canned, frozen and semi-cooked

	1	2	3	4	5	6	7	8	9	10	Total
Production 2002 (ton)	>1	30	34	36	39	65	65	66	70	122	527
% Live	100	75	82	70	80	50	57	90	67	80	72
% Canned	0	25	13	20	0	33	20	0	30	10	16.5
% Frozen	0	0	5	10	8	17	23	10	3	10	10.5
% Semi-Cooked	0	0	0	0	13	0	0	0	0	0	1
Tons Live	0	23	28	25	31	33	37	59	47	98	380
Tons Canned	0	8	4	7	0	21	13	0	21	12	87
Tons Frozen	0	0	2	4	3	11	15	7	2	12	55
Tons Semi-Cooked	0	0	0	0	5	0	0	0	0	0	5

Differences in firm structure and strategy that are indicative of diverse competitors are dealt with in Chapter Five.

4.2.10 Informational complexity

There are some firms within AFASA that will share their technology and expertise up to a certain level. As in any other business, however, there is a certain amount of technology that the firms like to keep to themselves. This does, of course, indicate rivalry.

4.2.11 Brand identity

As shown in Table 4.2, five of the ten abalone firms primarily sell their own product. All five of these firms have their own brand names. Two of the representatives said that their firms form marketing alliances with other firms; one of them has its own brand name. Two firms formed a joint marketing company; which sells their processed product under the same brand name, but their live products under their own name. One firm sells its product to three other South African firms. This firm does not have a brand name. There are thus eight entities with their own brand identity. This could indicate higher rather than lower rivalry.

Table 4.2 Marketing techniques employed by AFASA members

Firms primarily selling their own product	5
Firms forming marketing-alliances with other firms	2
Firms that have a joint marketing company with another abalone firm	2
Firms selling to other South African abalone firms	1

4.2.12 Representatives' perception of their competitors

In addition to Porter's indicators, interviewees were asked how they would describe the degree of rivalry among the South African abalone producers. Six of the ten indicated that they did not see one another as rivals. They do not compete with one another; but with Australia, New Zealand, Taiwan and the other abalone producing countries (see Chapter Five: 107). They feel that the market is big enough to house all of them and that by working together to create a better product and better product awareness they can probably wean some of the market away from brands such as Calmex®, a brand name for abalone from California and Mexico. Two of the six representatives are eager to join

cooperative marketing efforts, one of which is very large. They feel that it would result in an increase in the demand for South African abalone, as well as an increase in the bargaining power of South African producers.

Several representatives referred to the fact that little cooperation existed in the industry in the early days, but that this has changed dramatically. Three of the remaining four representatives used terms like 'friendly' and 'not animosity' to describe the relationship between them and their counterparts. The remaining representative fears that the market is not as unlimited as they think, which will drive each organization to maximize profits for themselves.

4.2.13 Interpretation

From the above eleven factors listed by Porter, five (high exit barriers, capacity augmented in large increments, diverse competitors, informational complexity, brand identity) indicate a high level of rivalry in the South African cultivated abalone industry, four (high corporate stakes, high fixed or storage costs, slow industry growth, lack of differentiation or lack of switching costs) are indicative of a low level and two (numerous or equally balanced competitors, value added to the product) resist categorisation.

Table 4.3 Rivalry among existing competitors

Factor	Level of rivalry
Numerous or equally balanced competitors	Resist categorisation
High corporate stakes	Low
High fixed or storage costs	Low
High exit barriers	High
Slow industry growth	Low
Lack of differentiation or lack of switching costs	Low
Capacity augmented in large increments	High
Value added to the product	Resist categorisation
Diverse competitors	High
Informational complexity	High
Brand identity	High

In brief, this signifies that the degree of rivalry in the industry could intensify. While the demand exceeds the supply, however, this is unlikely. If the industry acts pro-actively by promoting South African abalone, thus increasing demand

for it, the decline of rivalry is even more likely. However, since most of the representatives did not see the promotion of South African abalone as necessary while demand exceeds supply, it does seem likely that rivalry may increase in the near future. According to Porter's Five Forces model, this would bring about a decline in profits and make the industry less attractive.

4.3. THREAT OF NEW ENTRANTS

The easier it is for new enterprises to penetrate an industry, the harsher will be the competition. New entrants can change major determinants of the market environment, such as prices and customer loyalty, at any time. The threat of new entrants depends on the barriers to entry that are present in the industry. Porter (1980:7-15, 2002) identified the following barriers:

4.3.1 Economies of scale

To evaluate the role of economies of scale as barrier to new entrants, this section investigates the relationship between firm size and the portion of running costs spent on various expenses.

Table 4.4 shows the distribution of running costs for the whole industry. One of the representatives said that after consulting several of his colleagues, he realised that the production costs per unit for the different firms are remarkably close. However, according to the data collected for this study, the distribution of the running costs differs greatly. This is especially evident in the percentage of running costs spent on salaries and wages. In total, salaries and wages make up more than a third of running costs.

Table 4.4 Average distribution of running costs in the industry

Running Cost	Percentage
Salaries and Wages	31.27
Cost of Sales	20.91
Kelp	8.27
Repairs & Maintenance	7.22
Electricity	6.77
Artificial diet	5.27
Technology	2.08
Total	81.79

It is to be expected that the number of personnel employed per tonnage produced will decrease as tonnage produced increases. It is therefore also necessary to consider the influence of personnel in the investigation of economies of scale.

Figure 4.4[2] shows the number of personnel divided by the tonnage produced in 2002. The firms are arranged according to their production in 2002. Firm one produced the smallest quantity and firm nine the largest. According to the graph there is no real correlation between the total tonnage produced at the individual firms and the number of personnel employed to generate one ton of abalone. The firm with the second highest production is the one that employs the most personnel per ton of production, whilst the one with the smallest production employs the least personnel per ton of production. As the farms have not reached their full production, this should however, not be seen as an indication of diseconomies of scale. It is therefore not possible to draw any conclusion about the relationship between firm sizes and worker productivity at this stage.

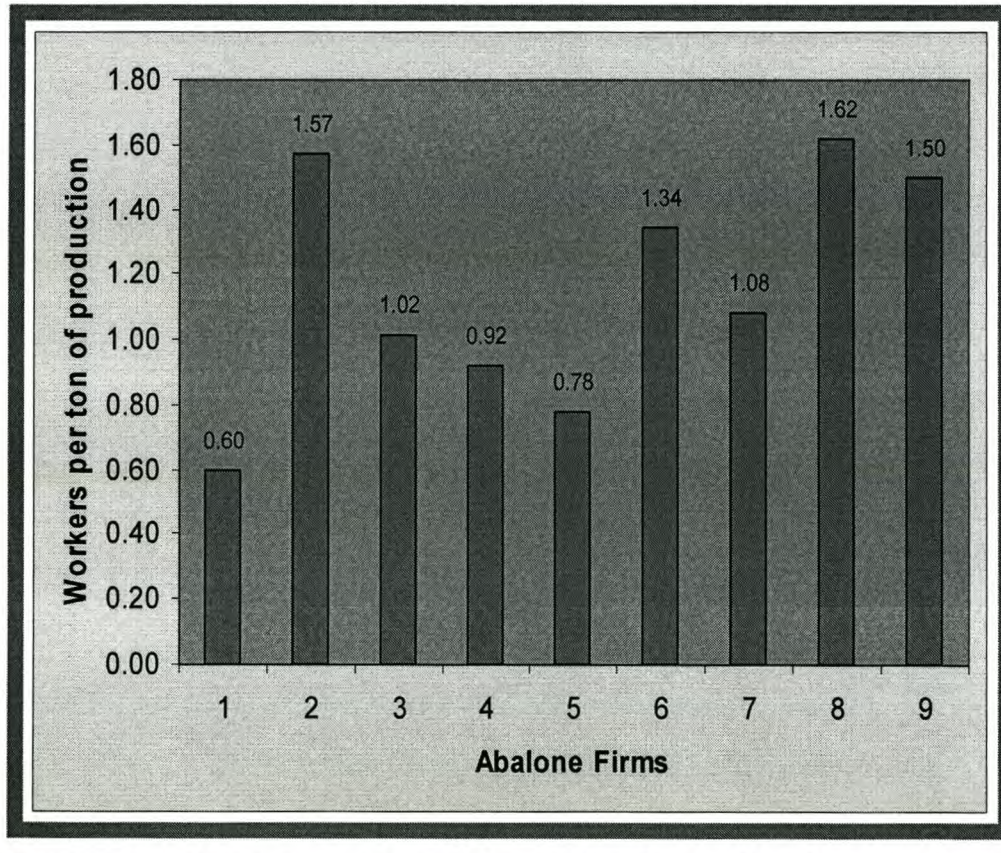


Figure 4.4 Average number of personnel employed per ton of production

[2] Only nine farms are included in the graph, as the tenth produced less than one ton.

Another factor regarding economies of scale is the percentage of running costs spent of 'Cost of Sales'. In accounting, the term refers to the costs directly related to the purchase or production of whatever a company sells.

The South African abalone firms, however, use the term to describe all the costs involved in selling the product. These costs can include a number of items such as freight costs, freight insurance, cost of getting a health certificate, canning fees, feeding fees, commission on sales, bank charges, trade insurance, discount and credit insurance.

Since the different firms do not necessarily categorise the same group of expenditures under 'cost of sales', it is difficult to compare these figures among the firms. However, according to the data, cost of sales ranges between 10% and 34%. The average proportion of funds spent on the sale of products is 20.91%.

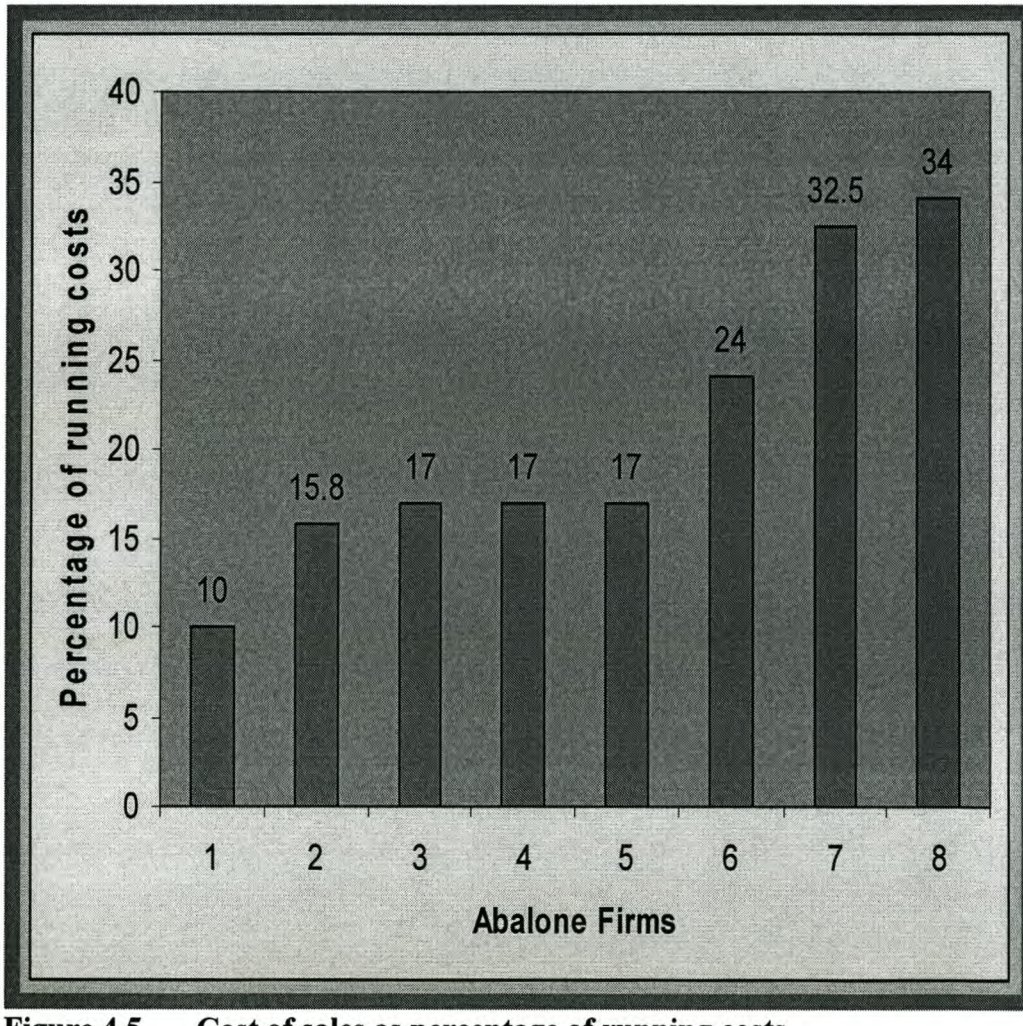


Figure 4.5 Cost of sales as percentage of running costs

Of the eight firms included in Figure 4.5, the firms spending 32.5% and 34% on the sale of their products produced respectively the smallest and largest tonnage

in 2002. The data therefore do not indicate a relationship between firm size and the portion of running costs spent on the sale of abalone.

The percentages of running costs spent on repairs and maintenance (see Figure 4.6) and electricity (see Figure 4.7) both show very uneven distributions. The percentage of running costs spent on kelp, artificial food and technology is assessed in subsequent sections, but there is no indication of a correlation between firm size and the portion of running cost spent on any of these expenses. According to the financial data collected from the different firms, therefore, there are no economies of scale in the industry. This can probably be ascribed to the fact that several of the farms have not yet reached full capacity. As mentioned earlier, however, many of the interviewees indicated that they could increase their production substantially without significantly increasing their production cost. This means that the financial data contradict the opinions of the interviewees. No conclusions on the role of economies of scale as a barrier to entry can therefore be drawn from the data

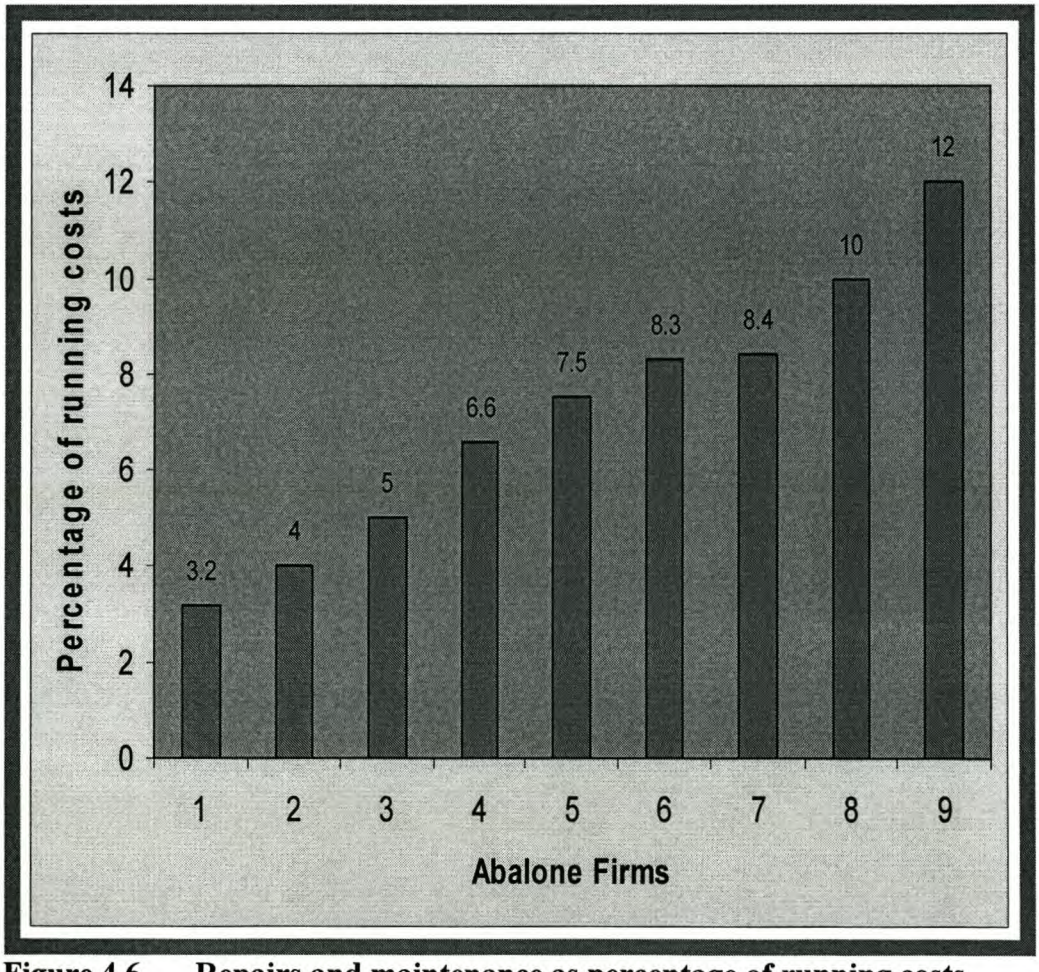


Figure 4.6 Repairs and maintenance as percentage of running costs

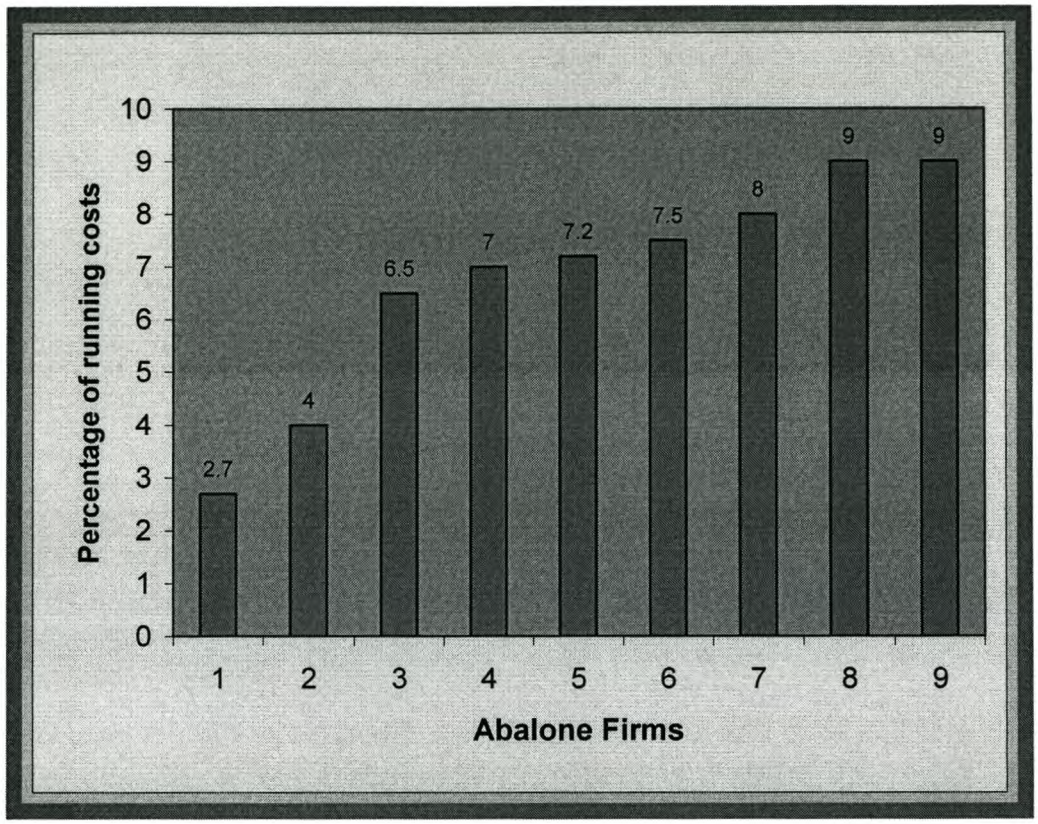


Figure 4.7 Electricity as percentage of running costs

4.3.2 Capital requirements

When asked what advice he would give to a new entrant into the industry, a key figure in the industry who often consults with his counterparts answered that *"...if he wants to do a reasonable size farm, 50 ton would cost R 20 million to kick off. This includes money for property, some capital expenditure and some running costs till he is up and running."* The large amount of capital required is therefore a significant barrier to entry that potential new entrants face.

4.3.3 Switching costs

As mentioned earlier, switching costs are high in the cultivated abalone industry. The resulting reluctance to switch from one supplier to another can also serve as a barrier to entry by potential new entrants.

4.3.4 Proprietary product technology

Respondents agree that as the abalone firms has done the research, the technical knowledge has stayed within the industry. Since the government did not share in this research, the technology did not become publicly available. Aspiring abalone farmers can however join the abalone farmers association (AFASA),

and get involved with their Research and Development program. There are some farms within AFASA that will share their knowledge up to a certain level.

Another crucial factor is the selection of technical staff, which is especially important in the hatchery. As there are several abalone farms in South Africa a sufficient number of people have trained in hatchery technology. While a new entrant might briefly upset one/two firms by attracting their personnel, it has often occurred in the past and seems to be an acceptable practice. Another reason why proprietary product technology does not serve as a significant barrier to entry, is that a great deal of information is publicly available.

4.3.5 Proprietary product differences

According to Porter (1980:9), established firms usually have brand identification and customer loyalties resulting from past promotions and customer service, or simply because they were first to enter the industry. It can be assumed that all eight of the entities with their own brand names supply to loyal customers.

Table 4.5 Year in which initial abalone venture started

Venture	Year started
Abagold	1984
Seaplant	1989
Premier Fishing	1990
Marine Growers	1991
I & J	1994
Aquafarm	1994
Jacobsbaai Sea Products	1995
Global Ocean	1997
HIK	1997
West Coast abalone	1997

Table 4.5 indicates the year in which the present abalone companies started with their initial operations. However, for many of the firms, it took several years before they could export their first product. Abagold, for example, exported their first 100 kg only in 1999. Although some established firms have therefore succeeded in building up customer loyalties, the long time it takes for a firm to establish a brand name, does act as a barrier to new entrants.

4.3.6 Access to distribution channels

According to Porter (1980:10-11), new firms must persuade the existing distribution channels to accept their product through price breaks, cooperative advertising allowances, and so on, which reduce profits. At this moment in time, demand exceeds supply and many of the existing abalone firms are more than willing to market the product of other firms. However, a firm starting in 2004 will probably only be able to sell its product in 2008, when the supply to demand ratio might be very different from that of today.

The South African abalone producers do not vigorously compete to buy the abalone of their counterparts. There is little price negotiation and the South African agents buying the abalone typically take as little as three or four percent commission. They would tell the abalone producer "*I could get you $35 for your product*". The producer then either accepts or declines the offer, knowing full well that the agent is going to get three or four percent and that there may be another agent in the importing country that takes another three or four percent. Theoretically it is thus in the best interest of both the local and the offshore agent to get the producing firm the highest price.

As the demand for quality abalone exceeds supply at present, new entrants into the market may possibly still be able to sell their own product. In the beginning it might however be better for them to leverage off someone else's experience and facilities. The new entrant can then gradually develop their own packaging facilities or form alliances with other companies and get involved with them, rather than work against them.

Once supply surpasses demand, however, it will be extremely difficult for new entrants to export their own product. Leveraging off someone else's experience and facilities might not be viable since established firms are not likely to sell the

abalone of their rivals until they have found markets for their own products. The difficulty to gain access to distribution channels can therefore be regarded as a barrier to entry.

4.3.7 Government policy

Government can limit or shut out entry into an industry by introducing measures such as licensing requirements and limits on access to raw materials (Porter, 1980:13).

Because there is no real consistent framework for starting up a farm, respondents think it is difficult to start a cultivated abalone venture in South Africa. Every site is quite unique and there are different government bodies that have to be approached. Since it is not possible for new entrants to apply to one person and get a permit to farm, they would have to do all the legwork through various departments to get permission from each one of those departments. It appears that in cases where there is no public resistance to the proposed project and the site is already agricultural or industrial land, it would normally take between one and two years to complete the red-tape. One of the most recent entrants took nearly three years to go through the approval process. This difficult process serves as a barrier to investors that consider entering the cultivated abalone industry.

4.3.8 Favourable access to raw materials and favourable locations

Established enterprises may already have the finest sources of raw materials. These enterprises could possibly 'tie up' foreseeable needs early at prices reflecting a lower demand than which exists at the time (Porter, 1980:11).

Seven of the ten representatives examined said that the most important influence on their choice of location had been availability. It is very difficult to find large premises that can be purchased as a unit. Vacant land is often privately owned and very expensive to buy in small pieces. The availability of favourable locations in South Africa is therefore a factor that restricts the development of new abalone cultivation firms.

4.3.9 Government subsidies

Preferential government treatment, such as subsidies, can give established firms long-term advantages in some industries (Porter, 1980:11). No subsidies have,

however, been awarded to the cultivated abalone industry. The possibility of preferential government treatment is thus not a barrier to entry.

4.3.10 Learning or experience curve

A great deal of the technology used on the farms is not difficult to use. The technology is common, and well known within the industry. As a result, one of the farmers has claimed that the majority of problems on an abalone farm are easy to solve. In the light of this remark, the learning curve new firms have to face does not seem to be a major barrier to entry.

4.3.11 Expected retaliation

The potential entrant's expectation of the behaviour of existing competitors can serve as a barrier to entry (Porter, 1980:14-15). As revealed in Section 4.2, there is a great deal of cooperation in the industry and rivalry is not a problem. The situation might change as the demand for high quality abalone is filled and the number of producers in South Africa increases. At present, however, the possible retaliation of current players in the industry is not an important barrier to entry to new entrants.

4.3.12 Interpretation

From the eleven factors listed by Porter, six (capital requirements, switching costs, proprietary product differences, access to distribution channels, government policy, favourable access to raw materials and favourable locations) serve as significant barriers for new entrants to the South African cultivated abalone industry and four (proprietary product technology, government subsidies, learning or experience curve, expected retaliation) do not serve as barriers, while no inference can be drawn from the last.

It would thus appear as if the industry is not as attractive to new entrants as one would have expected. However, if the demand for South African abalone increases, possible barriers such as access to distribution channels and proprietary product differences might well become less serious obstacles.

Table 4.6 Threat of new entrants

Factor	Barrier to entry
Economies of scale	Resist categorisation
Capital requirements	Yes
Switching costs	Yes
Proprietary product technology	No
Proprietary product differences	Yes
Access to distribution channels	Yes
Government policy	Yes
Favourable access to raw materials / favourable locations	Yes
Government subsidies	No
Learning or experience curve	No
Expected retaliation	No

4.4. BARGAINING POWER OF BUYERS

Bargaining power is how much pressure customers can place on a business. If one customer has a large enough impact to have an effect on a company's margins and volumes, then it holds substantial power. This makes any industry unattractive to investors. Porter (1980:24-26) identifies bargaining leverage and price sensitivity as factors that determine the amount of power that buyers may have.

4.4.1. Bargaining leverage

➔ **Buyers purchase large volumes relative to seller sales**

The majority of South Africa's abalone products are sold to overseas agents who probably buy from numerous producers in several countries. Some of the respondents suspect that as many as five South African entities sometimes sell to the same buyer. In this way, the buyers hold substantial bargaining power and are able to keep the South African producers in suspense, whilst they decide from whom they want to buy. Even though the South African producers ask the

same price, they try to outrun each other by offering the offshore agent the best possible quality and service.

At least two of the industry leaders believe that cooperative marketing would make business a great deal easier for all the South African abalone firms. When individual firms form marketing alliances, their volumes increase relative to the volumes purchased by the buyers, which results in an increase of the bargaining leverage of the producers. Since only three firms are involved in joint marketing ventures at present, it appears that the buyers of South African abalone have a significant bargaining leverage.

- **Buyer switching costs are low relative to firm switching costs**

Abalone producers need to build up a long-term relationship with their clients overseas. Although they report that they receive phone calls and e-mails from overseas people wanting to buy abalone on a daily basis, new clients are not always necessarily good clients. A 'new client' could for instance sell abalone bought from a South African producer at a lower price than regular clients are asking. When the regular clients hear this, they also offer less. In this way, transactions with new clients can potentially lead to a reduction in price for the whole South African abalone industry. In this sense switching costs are very high for producers.

However, these costs are equally high for buyers. In a climate in which demand exceeds supply, offshore agents need producers that can supply them with high-quality abalone on a regular basis. It is important for an agent to know that they can trust their suppliers, otherwise they might suffer great losses.
At present, therefore, both suppliers and buyers face high switching costs. This means that in this regard buyers do not have substantial bargaining leverage.

- **The buyer has full information**

According to the respondents, market information is limited. The fisheries database of the Food and Agriculture Organisation of the United Nations (FAOSTAT) puts abalone under the group heading 'abalones, winkles, conchs' and is consequently of very little use for the players in the cultivated abalone industry. This general lack of information also probably decreases the bargaining leverage of the buyers of South African abalone.

- **Buyer firms are relatively more concentrated than supplying firms**

Since South African firms export the bulk of their products to China, Hong Kong, Japan and Malaysia, the buyers are situated far away from one another. With four farms (three firms) in Hermanus, three in Gansbaai, and one each in Port Elizabeth, Jacobsbaai, Kleinmond, and Stompneusbaai, the supplying firms are thus more concentrated than the buyer firms (Figure 4.8 indicates the location of the farms examined in the present study, excluding the one at Port Elizabeth).

Figure 4.8 Locations of the AFASA members' farms

This substantially reduces the bargaining leverage of the buyers. It is open to question, however, whether South African producers take full advantage of their proximity to gain bargaining leverage.

- **The buyer can purchase substitute products**

Buyers are able to buy abalone from other countries. Local abalone is however very similar to the much sought after quality Japanese Kuroawabi. Even though the demand for high quality abalone exceeds its supply, it can be expected that an increase in the price of South African abalone might cause buyers to switch from South African abalone to abalone species produced elsewhere. In this case, the buyers will hold substantial bargaining power. If South African abalone were to be promoted more actively, however, it would be more difficult for buyers to switch to other species and their bargaining leverage would thus be lower.

4.4.2 Price sensitivity

At present South African abalone is still considered among the best-quality abalone available on the market. Whilst countries such as Australia, California and Mexico actively promote their abalone, neither the South African government nor AFASA has put any effort into the promotion of South African abalone. If the intuition of one of the major South African producers is correct, this will reduce the price of South African abalone to the same as that of less desired species.

On the subject of the promotion of SA abalone, the opinions of the respondents differ greatly. While five representatives indicated that it was necessary to promote SA abalone actively and that government should assist them in this, two felt that promoting SA abalone might be a good idea, but was not a priority and the government was unlikely to help. Three more representatives said that the fact that demand exceeded supply, rendered promotion unnecessary. This reluctance of South Africa's abalone producers to establish a brand name for South African abalone increases the sensitivity of offshore buyers to price due to global supply fluctuation.

4.4.3 Representatives' perception of the bargaining power of buyers

Respondents indicated that there was very little price negotiation as a result of which the offshore agents held substantial bargaining power.

4.4.4 Interpretation

From the five factors employed to assess the bargaining leverage of buyers, two (volume purchased by buyers relative to sales of sellers, availability of substitutes) indicate that the overseas clients of South African abalone cultivation firms have some bargaining power, while three (switching costs, lack of information, proximity of buyer firms relative to proximity of seller firms) show that the level cannot be very high.

Table 4.7 Bargaining leverage of buyers

Factor	Level
Buyer purchase large volumes relative to seller sales	High
Buyer switching costs are low relative to firm switching costs	High
The buyer has full information	High
The buyer can purchase substitute products	Low
Buyer firms are relatively more concentrated than supplier firms	Low

Buyers' sensitivity to prices does not indicate who holds the most bargaining power. It is interesting that this finding contrasts with the views that interviewees expressed when specifically asked how they experienced that bargaining power of buyers. This discrepancy may be due to the fact that South African producers do not make full use of their bargaining leverage, as mentioned above.

Increasing the demand for South African abalone by means of promotion could decrease the bargaining power of the buyers of abalone. However, since only fifty percent of the representatives feel that the industry needs to promote South African abalone, if possible in collaboration with the department of trade and industry, the mind-set of the remaining representatives could lead to a substantial reduction in the price of South African abalone once the Asian markets are saturated.

4.5. BARGAINING POWER OF SUPPLIERS

According to Porter, the more the suppliers an industry is able to use, the lower the bargaining power of such suppliers. In the abalone industry, there are only two industry-specific suppliers that can place substantial pressure on a business. Since both have a large enough impact to affect the company's margins and volumes, they consequently hold substantial power. The one supplier provides kelp and the other artificial diet.

4.5.1. Bargaining power of kelp suppliers

- **Number of kelp suppliers**

The abalone firms make use of four different kelp suppliers. The seven firms in the Kleinmond, Hermanus, and Gansbaai area can effectively make use of only three kelp suppliers, as the remaining kelp supplier is situated at the West Coast. Due to high transportation costs, obtaining kelp from this supplier is unfeasible. In addition, only two of the three plausible suppliers offer fresh kelp of a reasonable quality. Abalone firms will usually only make use of the third supplier if they are truly desperate.

The two firms in the Jacobsbaai, Stompneusbaai areas are even worse off. They can only make use of one supplier that they find uncompromising. According to the one representative, this supplier told him that he had no choice but to buy from him, and therefore had to pay the price, if he did not want to close his business. The representative indeed had to pay the supplier's price.

According to one respondent, abalone firms were not allowed to apply for concession rights for kelp. This greatly contributed to the negative attitude of abalone firms towards the various government departments and towards the confidence of the supplier described above. The small number of kelp suppliers together with the government's decision not to grant concession rights to abalone cultivation firms resulted in tremendous bargaining power for the kelp suppliers.

- **Importance of kelp for abalone farmers**

The percentage of running costs spent on kelp, which ranges between 1 and 20, can possibly serve as an indication of the importance of kelp for abalone farmers. If it is taken into account that the farm spending the third highest

percentage only spent ten percent, the firms spending respectively 14% and 20% of their running costs on kelp are outliers. The firm spending only one percent of its running cost on kelp grows all its own natural food. If it had to buy kelp, the kelp would have been almost 9% of their total running costs. Of the two firms spending 3% and 4.3% of their running costs on kelp, one is situated at the West Coast, where kelp is cheaper, and the other is the supplier of Abfeed®. The remaining five firms all spent between 7.2 and 10% of their running costs on kelp.

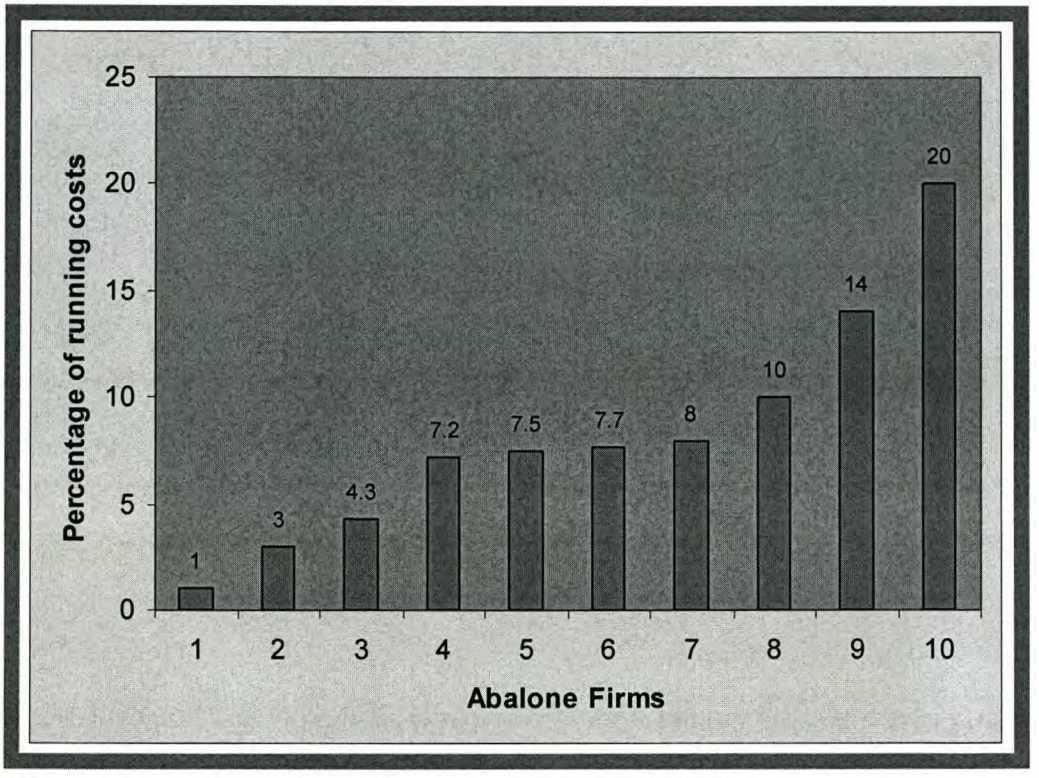


Figure 4.9 Percentage of running costs spent on kelp

Abalone firms are not yet able to grow their abalone on artificial diet alone; they need to grow their abalone on kelp as well. The bigger sized animals are apparently more susceptible to worm infestation on artificial diet. All the firms, including Seaplant products, a producer of artificial diet, therefore make use of both kelp and artificial diet, even though the one firm uses artificial diet only on an experimental basis. The great importance of kelp in the cultivation of abalone increases the bargaining power of the kelp suppliers.

- **Degree to which kelp is differentiated**

According to Eilon's explanation of product differentiation examined in Chapter Two of this study, 'differentiation' is not confined to product design and

functional specifications. Product differentiation includes several other attributes, such as quality and reliability, prompt supply and after-sales service.

South African kelp differs in terms of quality and reliability of supply. None of the suppliers give any after-sales service and kelp is not delivered promptly. Neither do suppliers add value. While this might change in the near future as one kelp supplier is currently working with abalone firms to create a type of feed that consists of four different kelp varieties, respondents feel that the problem of punctuality can be largely overcome if the abalone firms collect their own kelp.

According to Eilon's definition of differentiation, the kelp from the South African industry is therefore not well differentiated. This decreases the bargaining power of the kelp suppliers.

- **Proportion of the kelp suppliers' total product purchased by abalone firms**

At present the abalone firms buy the bulk of the kelp available from South African suppliers. This further increases the bargaining power of the kelp suppliers.

- **Profitability of kelp industry versus the profitability of the cultivated abalone industry**

The profitability of the kelp industry was not examined in the current study. However, since the cultivated abalone industry is much larger than the kelp industry, it can be safely assumed that the profit generated by the cultivated abalone industry is much larger than that of the kelp industry. According to Porter's Five Forces model, this factor is likely to decrease the bargaining power of kelp suppliers.

- **Possibility of kelp suppliers becoming abalone farmers**

Since the concession to harvest kelp has been granted to previously disadvantaged people who are generally poor, it is relatively clear that the kelp suppliers do not have the capital or expertise to start-up an abalone farm. This lack of ability decreases the bargaining leverage that the kelp suppliers might hold over the abalone industry. This state of affairs can only change with government intervention.

➧ **Representatives' opinion on the bargaining power of kelp suppliers**

All the respondents of firms making use of kelp suppliers say that very little price negotiation occurs. The kelp concession holders determine the price and the abalone firms have to accept these prices. Some of the abalone firms negotiate price as an entity, even this unit apparently holds very little bargaining power. Respondents see the high demand in which kelp is at present, as strong bargaining leverage for suppliers.

➧ **Interpretation**

From the six factors listed by Porter, three (number of kelp suppliers, importance of kelp for abalone farmers, proportion of the kelp suppliers' total product purchased by abalone firms,) indicate a high level of bargaining power for the kelp suppliers, two (degree to which kelp is differentiated, possibility of kelp suppliers becoming abalone farmers) are indicative of a low level of bargaining power and one (profitability of kelp industry versus the profitability of the cultivated abalone industry) is unindicative of bargaining power.

Table 4.8 Bargaining power of Kelp suppliers

Factor	Level
Number of suppliers	High
Importance of product for abalone farmers	High
Degree to which product is differentiated	Low
Proportion of the suppliers' total product purchased by abalone firms	High
Profitability of supplier industry versus the profitability of the cultivated abalone industry	Low
Possibility of suppliers becoming abalone farmers	Resist categorisation

In brief, this signifies that the kelp suppliers hold a substantial degree of bargaining power. As more and more firms commence production or increase the production of their own kelp, however, the lower their bargaining power will

become. In other words, the bargaining power of the kelp industry is not likely to distract from the attractiveness of the South African cultivated abalone industry in future.

4.5.2 Bargaining power of South African artificial diet suppliers

- **Number of artificial diet suppliers**

Abfeed® is the only artificial diet supplier in South Africa. Eight of the ten firms examined use Abfeed®. The remaining two firms import artificial diet from other countries. According to one of the respondents, growth rates achieved over a period of time on one of these two diets are almost twice that of those achieved on Abfeed®. The price of this imported diet, including the tariff on imports, is apparently only two percent more per kilogram than Abfeed®. At present only one farm uses the diet, but with this advantage it can be expected that others might soon follow.

The respondent of one of the largest firms in the cultivated abalone industry said that "*if a third party (the other two parties are the kelp suppliers and Seaplant products) came into the business and supplied artificial diet at 20 to 30 percent lower, it would bring down the prices of everything else [kelp and Abfeed®]*". He was obviously not aware that another firm is working with a non-abalone group to develop an artificial diet that is cheaper than Abfeed®. The results were being tested at the time of the interview (August 2003) and that could make its appearance on the market during 2004.

The possibility of a cheaper locally produced diet and a more effective imported diet substantially decreases the bargaining power of the supplier of Abfeed®. In addition, the price of kelp will have to decrease or the level of service provided by the kelp suppliers will have to improve.

- **Profitability of Abfeed® versus the profitability of the cultivated abalone industry and the views of respondents**

The representatives of seven of the eight firms that use Abfeed® felt that the price of Abfeed® is reasonable, although some felt that the quality could be improved. The profitability of the product is, however, unknown. For the purposes of this study, profitability is therefore not indicative of bargaining power.

Importance of artificial diet for abalone farmers

One of the individuals involved in the development of Abfeed® explained that there are certain elements in Abfeed® that are not found in kelp and other elements found in kelp that are not in Abfeed®. Abalone can therefore not be cultivated on just Abfeed® or just kelp. Abfeed® and kelp should be used in combination with one another in order to obtain optimal growth rates. Another factor motivating firms to use Abfeed® is its feed conversion ratio. The feed conversion ratio of Abfeed® is 1:1. The feed conversion ratio of kelp is 1:15.

The distribution of the percentages of running costs spent on artificial diet (both imported and locally produced) is very uneven. As the two farms that produced respectively the most and least tonnages in 2002 spent nearly the same percentage of their running costs on diet, however, no apparent relationship exists between firm size and proportion of running costs spent on artificial diet.

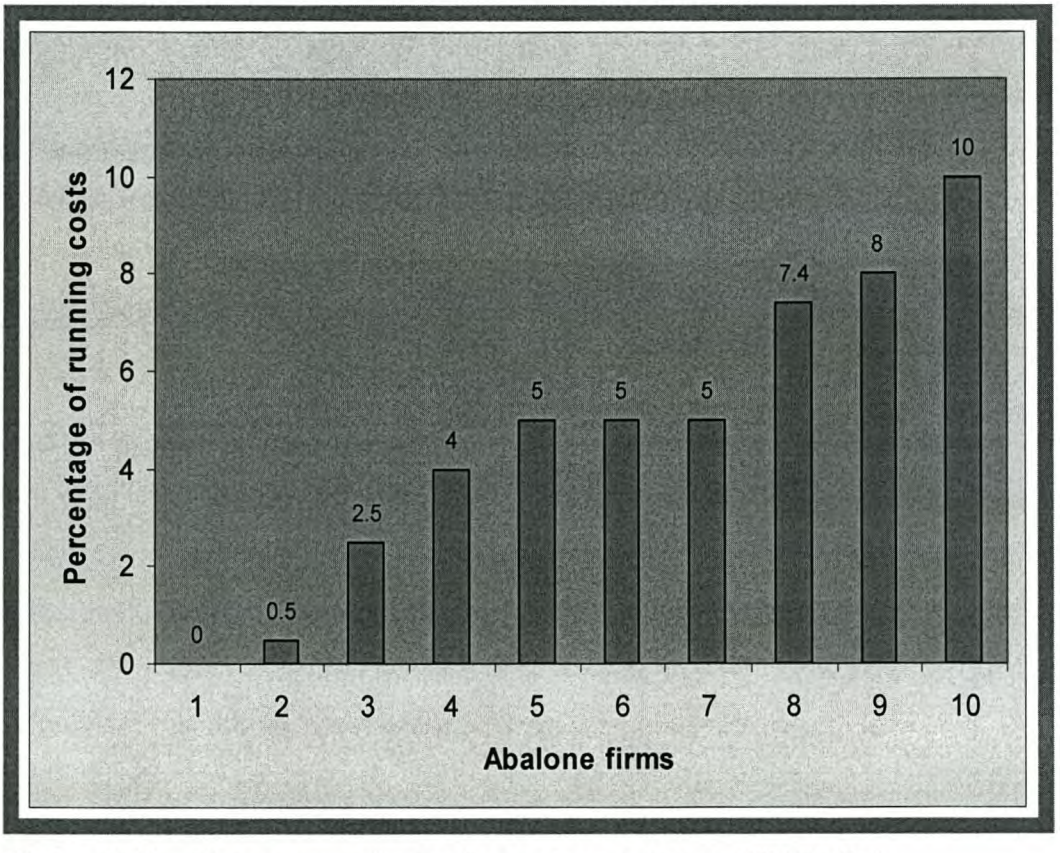


Figure 4.10 Percentage of running costs spent on artificial diet

As artificial diet is very important in the cultivation of abalone and Abfeed® is the only locally manufactured diet, the supplier of Abfeed® could hold substantial bargaining power.

- **Degree to which artificial diet is differentiated**

As Abfeed®, which is the only artificial diet produced in South Africa, is not able to satisfy the needs of the farm with the relatively higher water temperature and it is apparently not as effective as the diet imported by one of the firms, its bargaining power is decreased.

- **Proportion of the artificial diet supplier's total product purchased by abalone farmers**

Seaplant products, the manufacturer of Abfeed® provides artificial diet only to South African abalone producers. This further decreases the bargaining power of the supplier.

- **Interpretation**

From the above five factors listed by Porter, only one (importance of artificial diet for abalone farmers) indicates that the supplier of Abfeed® could hold substantial bargaining power, three (number of artificial diet suppliers, degree to which artificial diet is differentiated, proportion of the artificial diet supplier's total product purchased by abalone farmers) are indicative of a low level of bargaining power and one (profitability of Abfeed® versus the profitability of the cultivated abalone industry) is unindicative of bargaining power.

In brief, this signifies that the supplier of Abfeed® does not hold substantial bargaining power. However, if the second local diet supplier does not make its appearance or its quality is inferior to that of Abfeed®, or if the new 'astonishing' imported diet does not prove to be as astonishing as initially suspected, the bargaining power of the supplier of Abfeed® could increase.

4.6. CONCLUSION

In this chapter, four of the five forces listed by Porter were analysed in the context of the South African cultivated abalone industry. Of these, the relatively low threat of new entrants and the low bargaining power of artificial diet suppliers indicate that the abalone industry could be attractive to investors. On the other hand, the degree of rivalry among existing competitors and the strong bargaining power of kelp suppliers are factors that could make the industry less attractive. This, and the fact that the bargaining power of buyers is not

indicative of the attractiveness of the industry at all, signifies that the cultivated abalone industry is able to make reasonable profits and is thus a moderately attractive industry.

Table 4.9 Five Forces analysis of the South African cultivated abalone industry

Rivalry among existing competitors	Level of rivalry
Numerous or equally balanced competitors	Resist categorisation
High corporate stakes	Low
High fixed or storage costs	Low
High exit barriers	High
Slow industry growth	Low
Lack of differentiation or lack of switching costs	Low
Capacity augmented in large increments	High
Value added to the product	Resist categorisation
Diverse competitors	High
Informational complexity	High
Brand identity	High

Threat of new entrants	Barrier to entry
Economies of scale	Resist categorisation
Capital requirements	Yes
Switching costs	Yes
Proprietary product technology	No
Proprietary product differences	Yes
Access to distribution channels	Yes
Government policy	Yes
Favourable access to raw materials and favourable locations	Yes
Government subsidies	No
Learning or experience curve	No
Expected retaliation	No

Bargaining power of buyers	Level
Buyer purchase large volumes relative to seller sales	High
Buyer switching costs are low relative to firm switching costs	High
The buyer has full information	High
The buyer can purchase substitute products	Low
Buyer firms are relatively more concentrated than supplier firms	Low

Bargaining power of suppliers	Kelp	Abfeed®
Number of suppliers	High	Low
Importance of product for abalone farmers	High	High
Degree to which product is differentiated	Low	Low
Proportion of the suppliers' total product purchased by abalone firms	High	Low
Profitability of supplier industry versus the profitability of the cultivated abalone industry	Low	Resist categorisation
Possibility of suppliers becoming abalone farmers	Resist categorisation	

Force	Rating
Rivalry among existing competitors	Less attractive
Threat of new entrants	Attractive
Bargaining power of buyers	Resist categorisation
Bargaining power of kelp suppliers	Less attractive
Bargaining power of suppliers of Abfeed®	Attractive

By promoting South African abalone and thus not only reducing the possibility of rivalry, but also increasing the bargaining power of South African producers on international markets, the industry appears to have the potential to become more attractive.

CHAPTER FIVE
A DIAMOND MODEL ANALYSIS OF THE SOUTH AFRICAN CULTIVATED ABALONE INDUSTRY

5.1 INTRODUCTION

As argued in Chapter Two, the analysis of an industry would be more comprehensive if both Porter's Five Forces Model and the Diamond Model are applied. This chapter examines the South African cultivated abalone industry in terms of Porter's diamond analysis (Porter, 1990). The model offers a framework for assessing the competitive advantages and disadvantages resulting from the locations (countries) where the firms are based. It can be used to evaluate factors of production, local demand conditions, related and supporting industries, firm strategy, structure and rivalry, chance events and government.

The primary aim of the analysis is to assess how the fact that these abalone firms are based in South Africa influences the competitive advantages and disadvantages of the industry. Secondary aims include:

- outlining the structure and strategies of the different firms; and
- exploring related industries in which the abalone cultivation firms and/or their holding companies are involved.

5.2 FACTOR CONDITIONS

In his Diamond Model, Porter (1990) employed two methods to classify production factors. One method was to classify the factors as either basic (natural resources, climate, location, unskilled and semiskilled labour and debt capital) or advanced (highly educated personnel and university research institutions in sophisticated disciplines). The other method was to classify production factors as generalised (the highway system, a supply of debt capital, or a pool of talented university graduates in the field) or specialised (narrowly skilled personnel, infrastructure with specific properties, knowledge bases in particular fields, and other factors with relevance to a limited range or even just to a single industry). For an analysis of the competitive advantages and

disadvantages in the South African cultivated abalone industry, production factors are classified as basic or advanced.

5.2.1 Basic production factors

As mentioned before, South Africa has thirteen coastal regions, of which three host members of AFASA. To determine the competitive advantages for the cultivated abalone industry from its location in South Africa, these regions, the state of South Africa's seaweed resources and the availability of unskilled and semiskilled labour need to be examined.

- **Coastal regions**

Tables 5.1 to 5.3 show the three coastal regions of South Africa where members of AFASA can be found.

Table 5.1 Augulhas Coast

Firms in region	**Aquafarm development, Abagold, Global Ocean Holdings, HIK Abalone, Irvin and Johnson Danger Point, Premier fishing, Sea Plant Products**
Area	335 km from Cape Hangklip to the mouth of the Gouritz River
Rainfall	400 mm - 1 000 mm falling mainly during winter
Water temperature	Cape Agulhas separates the cool waters in the west from the subtropical east coast
Important resources	Abalone, kelp, red algae, pilchard, dageraad, white steenbras, kob, galjoen, black mussels, white mussels, rock lobster
Make-up of coast	43% are sandy beaches, 39% rocky shore and 18% wave-cut rocky platform
Rivers and wetlands	Breede and Gouritz rivers; Botrivier vlei, Kleinrivier vlei, Heuningnes and De Hoop vlei
Fishing	Centre of abalone industry (commercial, cultivated and poaching); commercial line-fishing operations in Hermanus, Gansbaai, Arniston, Struisbaai and Stilbaai

Source: South African Coastal Information Centre at http://sacoast.uwc.ac.za/index2.htm.

Table 5.2 West Coast

Firms in region	Jacobsbaai Sea Products, West Coast Abalone
Area	260 km from the Olifants River mouth to Bokpunt, near Atlantis
Rainfall	Semi-desert climate with low rainfall (100-400 mm annually)
Water temperature	Cold waters of the Benguela Current are drawn up from the deeper regions of the sea
Important resources	Nutrient-rich waters support dense phytoplankton blooms, extensive kelp beds and substantial stocks of fish, mussels, rock lobster and seals
Make-up of coast	73% are sandy beaches and the rest comprise of rocky shore and wave-cut rocky platforms
River and wetlands	Olifants and Berg rivers; Verlorenvlei, Rocher Pan and Langebaan Lagoon
Fishing	Centre of South Africa's commercial fishing industry. Trawl and purse-seine fisheries, together with the lobster fishery, dominate the economy of the region.

Source: South African Coastal Information Centre at http://sacoast.uwc.ac.za/index2.htm

Table 5.3 Sunshine Coast

Firms in region	Marine Growers
Area	385 km from the boundary of the Western and Eastern Cape provinces to the Great Fish River
Rainfall	Peak rainfall (500-650 mm) occurs in spring and autumn
Water temperature	Coastal waters are warm (although there is occasional up welling of cold water in places)
Important resources	More than 70 species of fish, including mullet, steenbras, zebra, blacktail and sole, as well as chokka squid and rock lobster
Make-up of coast	55% are sandy beaches, rocky headlands make up 24% and wave-cut rocky platforms 21%
River and wetlands	Several large estuaries, such as the Swartkops, Krom, Kowie, Boesmans, Great Fish, Gamtoos and Sundays
Fishing	Most important fishing activities are based on chokka squid, kingklip and sole

Source: South African Coastal Information Centre at http://sacoast.uwc.ac.za/index2.htm.

Seven of the firms (eight of the farms) are situated alongside the Agulhus Coast. This region is the centre of the commercial abalone industry and has the largest occurrence of wild abalone. When starting an abalone venture, investors prefer to put up farms in areas where abalone occur naturally as they deem this to be an indication that these areas are best suited for abalone cultivation.

The pioneers of the two firms on the West Coast chose their sites because they already had structures that could be used in the cultivation of abalone. According to the one respondent, the toxic PSP red tide is an ever-present threat on the West Coast. He says that it was initially believed that abalones were not affected by PSP, but that this notion has since been proved to the contrary.

According to a respondent, abalone grows optimally at between 18 and 22 degrees Celsius. This respondent also reported that the area along the Sunshine Coast, where one of the abalone firms is situated, experiences this temperature for a longer period of time than other areas along the South African coast.

➔ **Seaweed Resources**

As mentioned in Chapter Four, seaweed is indispensable for abalone farmers. Prior to 1992 abalone cultivation firms demanded practically no fresh kelp fronds (leaves). Since then it increased to more than 2800 tons in 2001. This forced government to set maximum sustainable yields in the Seaweed Rights Areas containing the *Ecklonia maxima* and *Laminaria pallida* kelp varieties. South Africa's seaweed resources are now separated into 23 areas. Granting exploitation rights for the different species according to the capacity of the regions allows government to manage this resource on an area controlled basis. Research that helps to assure the sustainable harvesting of South Africa's kelp resources is conducted by Marine and Coastal Management (M&CM).

Together with the University of Cape Town (UCT) and the University of the Western Cape, M&CM has conducted research on the potential for cultivating seaweeds (*Gracilaria* and *Ulva*) in tanks at the Irvin & Johnson Danger Point farm as well as the Jacobsbaai Sea Products farm. According to their results the highest growth rates are obtained in summer ($12\%d^{-1}$ in *Ulva* and $5\%\ d^{-1}$ in *Gracilaria*), in wastewater from the abalone tanks or in fertilizer enriched seawater (Anderson, 2002).

The effort by South Africa's resource institutions to ensure the sustainable harvesting of kelp and to examine its potential to be cultivated in tanks is a competitive advantage for abalone cultivation firms situated in South Africa.

- **Availability of unskilled and semi-skilled labour**

In South Africa, unemployment is very high and rising, and is considered to be one of the most critical socio-political challenges for the government (Kingdon and Knight, 2003). According to Lewis (2001), the overall unemployment in South Africa in the year 2000 was more than 36 percent and more than 50 percent for unskilled and semi-skilled workers. These high percentages show that South Africa is a country with an abundance of unskilled and semiskilled labour. Unskilled workers are those employees who do not need to use reasoning in the performance of their work at all, while semi-skilled workers are those who can read, write and communicate. Their jobs often do not require educational or apprenticeship credentials and they are only trained for a short period. The training is task-specific and usually does not require a great deal of reasoning skills.

The cultivated abalone industry provides jobs for 555 workers, most of whom are unskilled or semi-skilled. At an average of less than one worker per year, an exceptionally low worker turnover rate was reported at eight of the ten firms examined in this study. This figure is higher at the remaining two firms, where some workers, who belonged to a union that had forced them to participate in an illegal strike, were laid off at the beginning of 2004. Although many of these wanted to return to their jobs, the union would not allow them, and the firms had no choice but to fire them and appoint new personnel. This means that the South African cultivated abalone workforce is relatively stable on the whole.

It was not possible for all the participants in the present study to separate the salaries and wages of their unskilled and semi-skilled workers from that of their skilled workers. One interviewee also did not disclose data for salaries and wages. The percentage of running cost spent on salaries and wages of the remaining nine firms can however still provide an indication of the significance of human resources on abalone farms.

Two of the firms spend respectively 39% and 40% of their total running costs

on salaries and wages and two others only 22%. The number of personnel employed per tonnage produced for the abovementioned four firms is 0.60, 0.78, 0.92 and 1.5. One would expect the firm spending 39% of its running costs on salaries and wages to have the second highest personnel: tonnage produced ratio. Surprisingly, however, the ration is the lowest among all ten firms examined. The firm spending 40% also has the third lowest personnel-tonnage produced ratio. It would therefore seem that the productivity of personnel does not explain the variation in percentages of running costs spent on salaries and wages.

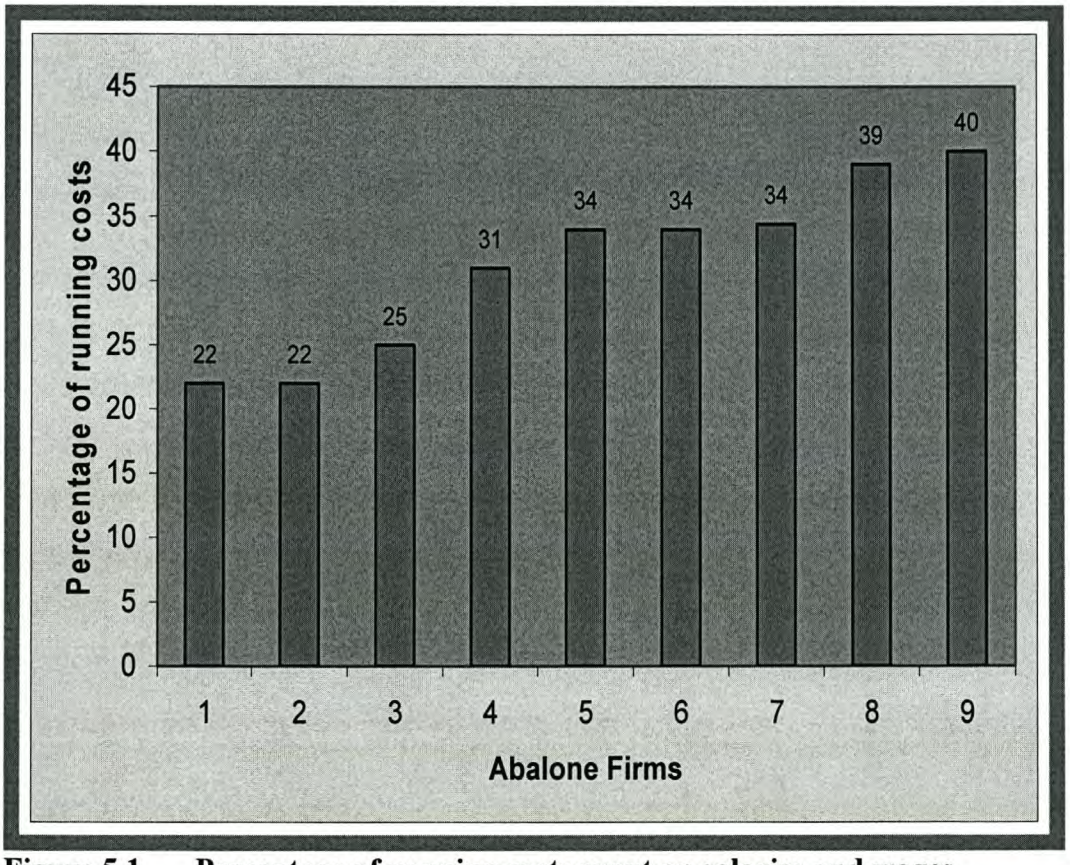


Figure 5.1 Percentage of running costs spent on salaries and wages.

➧ **Interpretation**

The Heckscher-Ohlin theory predicts that countries export the products that use their abundant factors intensively. Cultivating abalone is labour intensive and South Africa has an abundance of out of work unskilled and semi-skilled labourers. Although South African abalone firms spend up to 40% of their total running costs on salaries and wages, the figure would have been higher if it were not for the country's abundance of out of work unskilled and semi-skilled labourers. It would therefore seem as if being based in South Africa is a

competitive advantage to abalone producers.

5.2.2 Advanced production factors

Advanced production factors that Porter (1990:77-78) identified are highly educated personnel and research institutions. Information on the resources spent on technology by the different firms is included.

Table 5.4 Highly educated personnel by firm

Firm	A	B	C	D	E	F	G	H	I	J	Total
Civil Engineer			2								2
Chemical Engineer	1								1		2
Mechanical Engineer					2						2
Mechanic/ mechanical diploma	1								1		2
Fitter& Turner/ technical background/ diploma		1				1	1		1	1	5
Electrician		1	1			1					3
Marine Biologist	1	2	1			1				2	7
Biologist	1		1	1	1		1		1		6
Agriculture degree				1				1	1		3
Business degree				1		1	1		1		4
Accountant									1		1
Back-up company/ co-owners with business experience	1	1	1	1	1	1	1	1	1	1	10
Professional diver	1	1									2
Person with 20+ years experience in mariculture			1		1		1				3
Person with experience in water filtration/ waste water management	2			1							3
Total	8	6	5	5	5	5	5	2	8	4	55

➧ Highly educated personnel

The personnel of the member-firms of AFASA include two civil, two chemical and two mechanical engineers; two mechanics or persons with mechanical diplomas, five persons that are either qualified as fitters-and-turners or have a technical background or qualification, three electricians, thirteen biologists, of which seven are marine biologists, three persons with degrees in agriculture, one chartered accountant, two professional divers, three persons with more than twenty years' experience in the mariculture industry, one person with experience in water filtration and two persons with experience in wastewater management.

In addition, all the member firms are owned, co-owned or backed by people with business experience. Although the expertise is not equally spread among the firms, a wealth of relevant knowledge exists. According to the interviewees, even the highly educated personnel at abalone firms can be replaced with ease. The availability of highly skilled workers in South Africa is therefore a factor that further increases the competitiveness of the South African cultivated abalone industry.

➧ Research institutions

Among the ten representatives, six South African research institutions were mentioned that have contributed to the success of their firms. The six institutions (in no particular order) are Rhodes University, the University of Cape Town, the University of Stellenbosch, the University of Port Elizabeth, Marine and Coastal Management (Directorate: Research) and the National Research Foundation. This support is also a positive indication of competitive advantage.

- *Rhodes University*

  The Department of Ichthyology and Fisheries Science at Rhodes University was founded in 1981 and is the only department of its kind on the African continent (Rhodes University, 2004). Recent research completed on abalone at the department includes studies on *Polychaeta: Sabellidae*, the potential of abalone stock enhancement in the Eastern Cape, and the nutrient digestibility and protein requirements of South African abalone.

- *University of Cape Town*

The University of Cape Town has a centre for marine research and for the training of marine scientists. At present, more than a 100 marine scientists are working in the Departments of Botany, Chemistry, Engineering, Environmental and Geographical Science, Geological Sciences, Oceanography, Surveying and Zoology. Many of these are full-time researchers who are sponsored by outside funding organisations.

Although none of the Universities in South Africa offer a major degree specialising in Marine Biology, it is possible to structure an undergraduate curriculum in the senior years of a BSc at UCT, which emphasises marine studies with majors in Zoology, Botany or Ocean and Atmospheric Science (University of Cape Town, 2004). The two most recent studies done on abalone at the University were an investigation into the factors influencing the ranching of South African abalone along the Namaqualand Coast and a study on the implications of a new shell-infesting sabellid on the abalone mariculture.

- *University of Stellenbosch*

The Aquaculture division at the University of Stellenbosch was established in 1989 and aims to contribute to the development of the aquaculture industry of South Africa through higher education and training and innovative research, and by providing consultation and extension services to the private industry.

Programmes in aquaculture that are on offer include a certificate course, B.Agric, B.Sc, and B.Sc.Argic degree courses majoring in Aquaculture and M.Phil, M.Sc and Ph.D post-graduate courses. Interestingly, one of the respondents interviewed is currently completing the certificate course through correspondence.

The fields of research at the Division include Genetics, Nutrition, Physiology, Ecology, Food Science, Economics and Conservation. Studies conducted at the university include a technical, marketing and financial feasibility analysis of abalone cultivation ventures (University of Stellenbosch, 2004).

- *University of Port Elizabeth*

The University of Port Elizabeth has neither a marine centre nor an aquaculture division. Both its Botany and Zoology departments are however involved in abalone research. Abalone-related research at the University includes a study on integrated seaweed-abalone farming and a comparative study on the production and suitability of two *Ulva* species as abalone fodder in a commercial mariculture system (University of Port Elizabeth, 2004).

- *Marine and Coastal Management*

Marine and Coastal Management (M&CM), a branch of the Department of Environmental Affairs and Tourism, is officially responsible for the development of marine and coastal resources (Department of Environmental Affairs and Tourism, 2004a). (Also see Section 5.7.2 in this chapter.)

- *National Research Foundation*

The National Research Foundation (NRF) was founded to support and promote innovation and development in all fields of the natural and social sciences, humanities and technology and to facilitate the creation of knowledge. It does this through funding, human resource development and the provision of research facilities. (National Research Foundation, 2004).

Resources spent on research and development

All the members of the abalone farmers association of South Africa contribute to a Research and Development program. While three of the ten firms do very little research of their own and have spent less than 1% of their total running costs on research and development, another four have spent approximately one percent of their total running costs. The latter do not have any permanent research and development personnel, however. The remaining two firms have spent 3% and 5.5% respectively. The interviewee did not disclose the data for the tenth firm.

Two firms employ one researcher each. At both of these firms the researchers are primarily involved in other projects such as fish culture and the cultivation of mussels and it is therefore difficult to estimate the funds spent on technology.

The remaining firm has a research manager assisted by a technician. They work only on abalone and the cultivation of natural feed.

➧ **Interpretation**

Abalone firms based in South Africa can replace their highly educated personnel without difficulty. This, together with the country's various research institutions, gives the South African abalone industry a strong competitive advantage.

5.3 DEMAND CONDITIONS

In South Africa, cultivated abalone firms may sell their cultivated abalone only to final consumers, provided that the abalone was processed and sold on the firm's own premises. Abalone firms are thus not allowed to sell abalone to a third party for resale to local consumers. Due to this strenuous legislation, consumers in South Africa can only purchase cultivated abalone at a restaurant in the Kleinmond harbour. Previously owned by an abalone firm that obtained special admission to sell some of its product to the restaurant, it now belongs to a non-abalone enterprise. In 2002 the quantity sold at the restaurant amounted to less than 0.01% of the cultivated abalone produced during that year. In no way could this have any effect on the local demand for abalone.

This prohibition on local sales has rendered the potential home market completely unknown. Since the commercial abalone industry was prohibited from selling its product to local consumers, even its significant decline is not likely to have an effect on the potential demand for cultivated abalone by South African consumers. In addition, although the recent closing of recreational abalone fishing, mentioned in Chapter One, may have some effect on the local demand, this effect is completely indeterminable.

The prohibition has also eroded any sophisticated or demanding buyers that might have been able to anticipate the needs of Asian consumers or pressure local firms to meet high standards. The fact that South Africa does not have consumers able to encourage the local abalone firms to innovate would, in Porter's view, be a competitive disadvantage for abalone cultivation firms based in South Africa.

According to an interviewee, AFASA and the M&CM are working to change this legislation. Although the abalone firms expect the local demand to be low, the representatives believe that some locals will also be willing to pay a high price for cocktail size South African abalone. Even a small local market can alleviate some of their problems with air space and give them more price stability when there are problems in the overseas markets.

5.4 RELATED AND SUPPORTING INDUSTRIES

There is no unified definition of a 'supporting industry', but it is usually regarded as an industry that supports the assembly of final products through the supply of parts (Yamazaki, 2004) and services. All supporting industries are thus supplier industries. Since buyer and supplier industries were examined in sections 4.4 and 4.5 only related industries other than buyers and suppliers are examined here. The aim is to determine whether these industries permit the abalone cultivation firms to co-ordinate and share activities in the value chain (also see Chapter Two). The most important industries that are related to the cultivated abalone industry are the abalone fishing (commercial, recreational, poaching) and processing sector and the six back-up companies that are involved in marine-related industries.

5.4.1 Abalone fishing and -processing industry

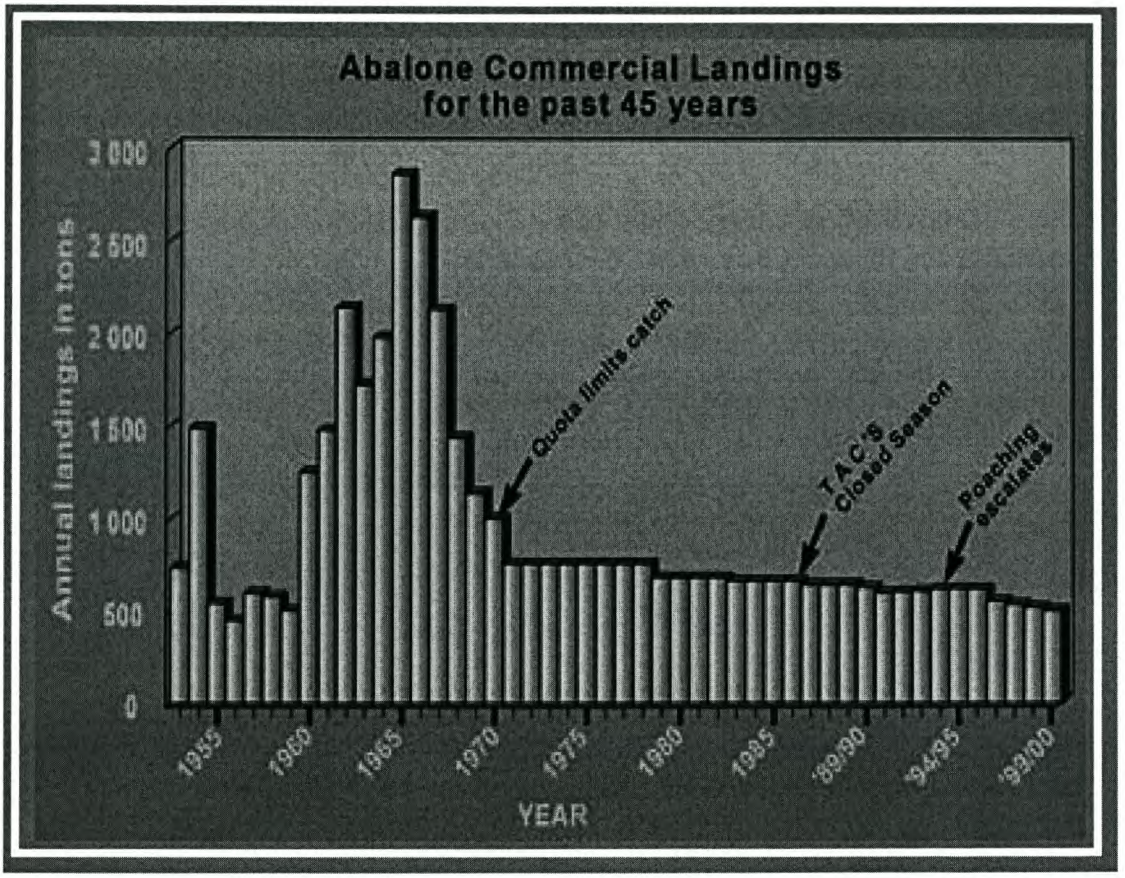
➧ Commercial fishing

The commercial fishing of abalone in South Africa began in the late 1940s. Quotas have limited the annual commercial catch since 1970. In the period of unlimited catching, yearly landings as high as 2 800 tons were recorded (Tarr, 2004). Declines in the abundance of wild abalone have necessitated regular reductions in the total allowable catch (TAC).

As mentioned in Chapter One, a new policy for the allocation of commercial fishing rights was recently introduced. According to the policy, government aims to allocate commercial rights to as many divers and legal entities (only South African companies and trusts and close corporations) as reasonably possible. Preference will be given to divers that are historically disadvantaged and legal entities that are owned/co-owned and managed/co-managed by

historically disadvantaged persons. Allocations are expected to be no more than 1 500 kilograms per season per right holder.

Since it might be possible for a group of commercial right holders to share and co-ordinate activities in the value chain with abalone farmers, this factor does not restrict competitive advantage.



(Source: Tarr, 2004)

Figure 5.2 Abalone commercial landings for the past 45 years)

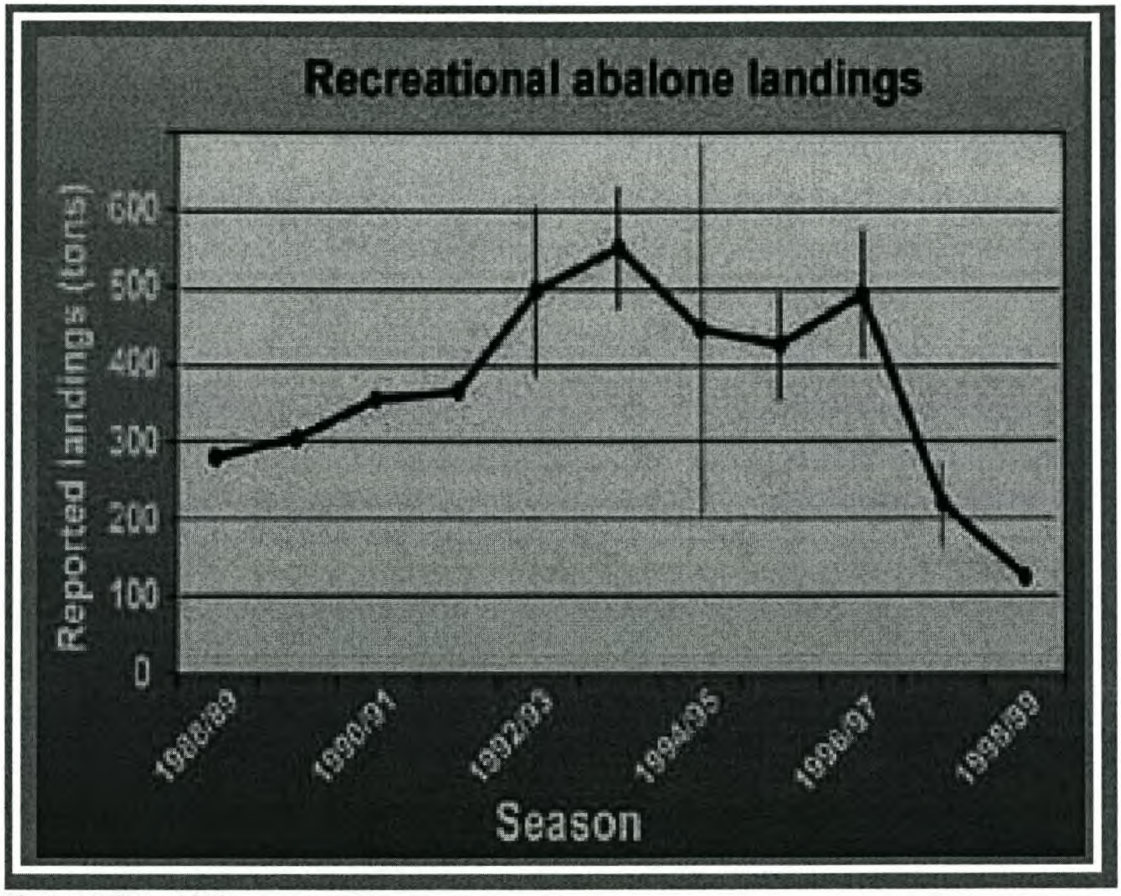
- **Poaching**

According to the Department of Environmental Affairs and Tourism (2003b) the illegal harvesting of abalone in South African waters amounted to approximately 1023 tons in 2001. This is more than triple the global TAC of 275 tons in the 2001/2002 season. This factor severely restricts the competitive advantage of the abalone industry.

- **Recreational abalone fishing**

Government sees the recreational fishing of abalone as an unnecessary threat to the thousands of jobs sustained by the commercial abalone industry. The

abalone recreational fishery will therefore be closed until the commercial fishery is no longer at any significant threat of closure (Department of Environmental Affairs and Tourism, 2004b).



(Source: Tarr, 2003)

Figure 5.3 Recreational abalone landings

- **Abalone processing sector**

The allocations for the abalone processing factories will gradually be reduced to zero over the next three years; the reason behind it is to prevent unnecessary unemployment and instability (Department of Environmental Affairs and Tourism, 2004b). This grace period will allow the abalone processing factories to reduce their reliance on abalone processing and to have their own abalone allocations, and will thus encourage them to look at the processing of other fish stocks instead.

The close-down of the abalone processing sector may lead processing factories to become more involved with the cultivated abalone industry. The sharing and co-ordinating of activities in the value chain, which Porter mentions as factors that increase competitive advantage, are therefore a real possibility.

5.4.2 Marine-related backup companies

The business of **I&J** and its subsidiary companies is the procurement, processing, marketing and distribution of frozen foods. This company distributes 1 000 active food product lines to over 13 000 retail, wholesale and food service customers throughout South Africa and beyond its borders (I&J, 2004).

Pamodzi, a black-owned empowerment consortium, and First Corp Capital have acquired a 32% stake in Foodcorp, which owns **Marine Products**. This company is involved in the catching and processing of white fish. It owns three vessels and has a 4% share of South Africa's annual hake quota. It is also involved in catching and processing pelagic fish, abalone and lobster. The company manufactures the Glenryk brand of pilchards (International trade centre, 2004).

The core business of **Premier Fishing** is catching, processing and marketing fish and other marine products. The company is involved in the pelagic, demersal, squid, and inshore fishing craft. It has cold storage holding capacity of 3 000 tons and about 45 tons of live lobster holding capacity in temperature controlled and purpose-built holding tanks. Premier Fishing is involved in the catching and processing of pilchards, lobster and anchovy (International Trade Centre, 2004).

According to Viljoen (2003), "*[t]he main business of* ***Saldanha Group*** *is pelagic fishing i.e., the catching and processing of pilchards and anchovy. The group markets its canned pilchards under the 'Saldanha' brand and also makes premium quality fishmeal*".

The principal business of **Sea Harvest** is deep sea trawling primarily of the ground fish species Cape Capensis, the processing of its catch into frozen and chilled seafood, and the marketing of its production, both locally and internationally. The company employs more than 3 000 people and has the capacity to catch and process over 80 000 tons (175m lb.) of fish per annum. This is achieved with a fleet of sixteen fresh fish trawlers and two factory freezer ships (Sea Harvest, 2004).

Du Plessis (2003) describes **TerraSan** as involved in tourism, abalone cultivation, the processing and farming of mussels, oyster farming, apple farming, and the pelagic fishing and processing industry.

5.4.3 Interpretation

Among the four abalone fishing and processing industries examined, two (commercial fishing, abalone processing sector) could co-ordinate and share activities in the value chain with the South African cultivated abalone industry and two (poaching, recreational abalone fishing) could not. All six marine related backup companies can co-ordinate and share activities with their abalone cultivation farms.

While some of the respondents said that they prefer to perform certain activities, such as marketing, without the help of their backup companies because offshore agents prefer to deal directly with somebody on the farm rather than with a marketer somewhere in the head office of a large corporate company, the large number of industries able to co-ordinate and share value chain activities with the abalone farms in South Africa is, in Porter's view, a competitive advantage for abalone cultivation firms based in South Africa.

5.5 FIRM STRATEGY, STRUCTURE AND RIVALRY

The fourth broad determinant of national competitive advantage in an industry is the context in which the firms are created, organised or managed, as well as the nature of domestic rivalry, which has been discussed in Chapter Four (Porter, 1990:107).

According to Porter (1990:108), "*nations will tend to succeed in industries where the management practices and modes of organisation are well suited to the industries' sources of competitive advantage*". He says that important differences in management practices occur in areas such as training, background and orientation of leaders, group versus hierarchical style, the strength of individual initiative, the tools for decision-making and the nature of the relationship with customers.

Although it has been shown in Chapter Four that the industry has no shortage of qualified personnel, the training and background of top management, the

organisational structure of the firms and the degree to which members of top management are involved in the marketing of their products is described here to show how this factor affects the organisational structure of each firm.

5.5.1 FIRM A

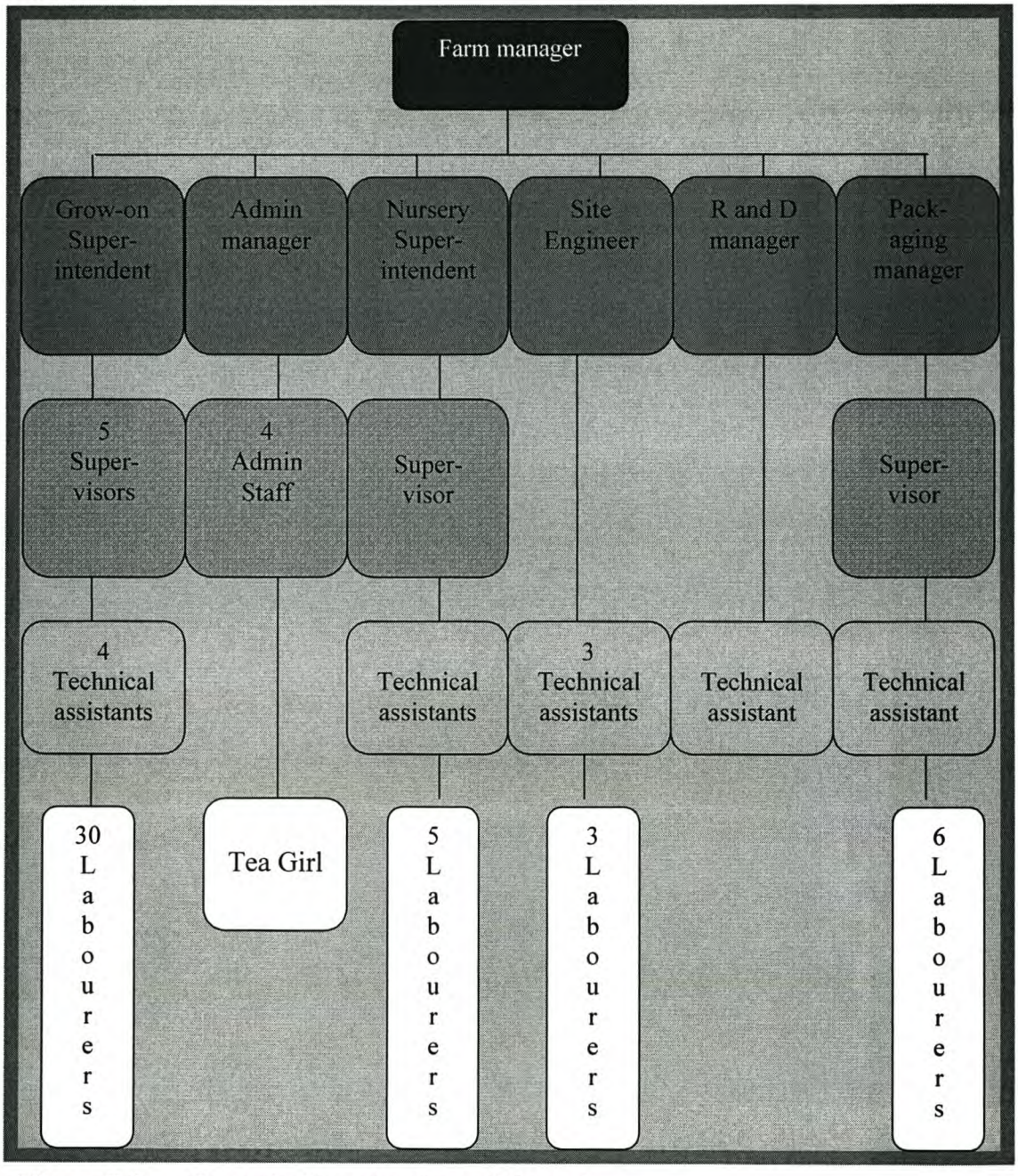


Figure 5.4 Organisation structure of Firm A

The manager of firm A started with research at the firm in 1991, when he was still a student. He completed his BSc Honours in Marine Biology before formally joining the company in 1993. The farm was built in 1994.

The manager is assisted by a management team of six members including a

B.Com graduate and someone with a technical diploma. Each of the members is responsible for a specific category of activities. Forty-five labourers headed by ten technical assistants support the managers. The backup company of the firm is responsible for most of the marketing-related issues.

5.5.2 FIRM B

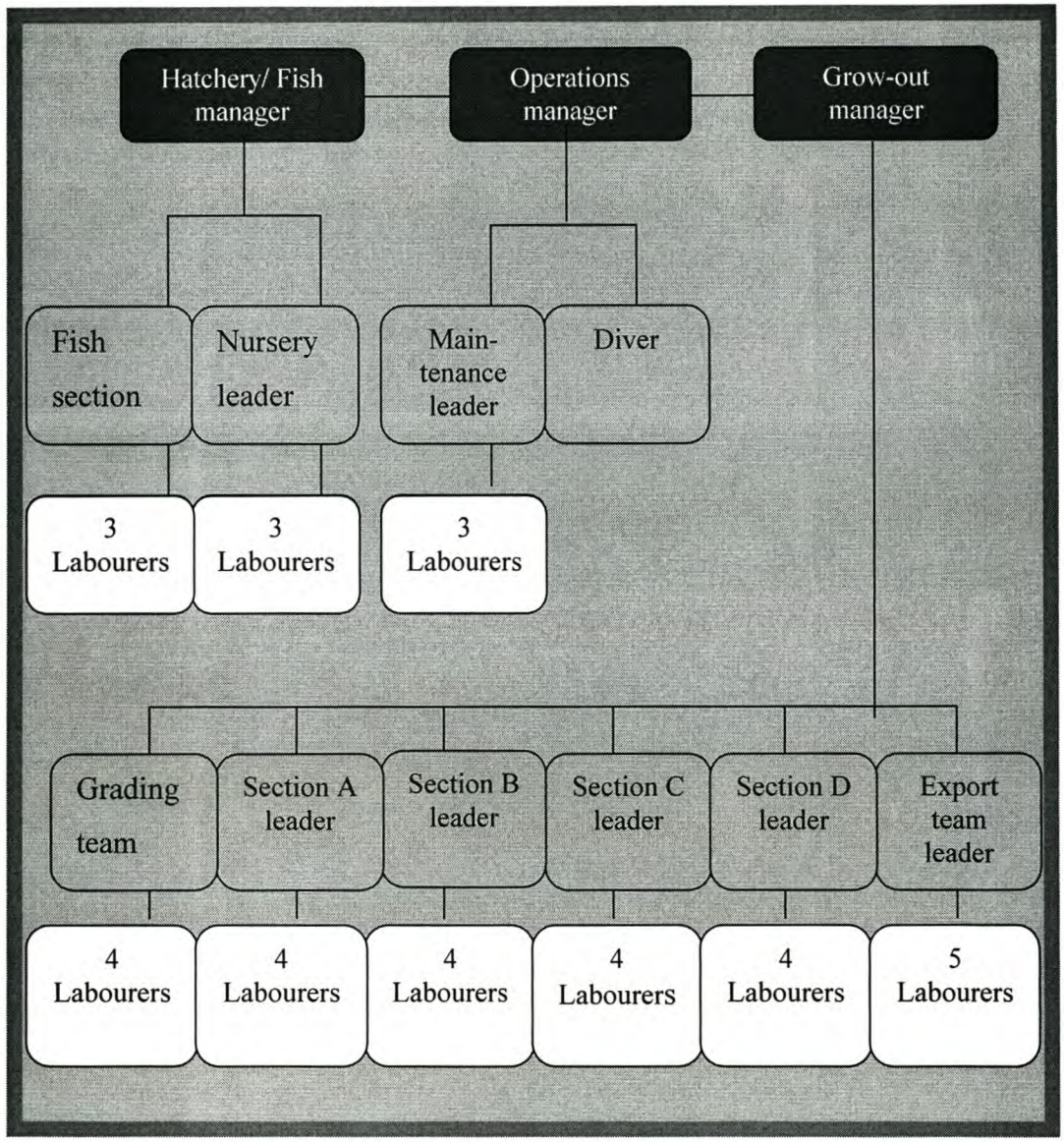


Figure 5.5 Organisation structure of Firm B

A managing committee consisting of two marine biologists and one operations manager manages firm B. The one marine biologist manages the farm's hatchery and fish cultivation division and the other one is responsible for the grow-out section. The operations manager is in charge of maintenance. The hatchery manager, qualified both as a journalist and a marine biologist, started

working at the firm in 1995. Before that time this person worked as a journalist. The operations manager was a handyman before starting in the current position in 1997. The grow-out manager completed his studies in 1998, before joining the firm in 1999. The back-up company of the firm is actively involved in the firm and is responsible for marketing as well as some of the administrative activities. In total there are 47 personnel working at firm B.

5.5.3 FIRM C

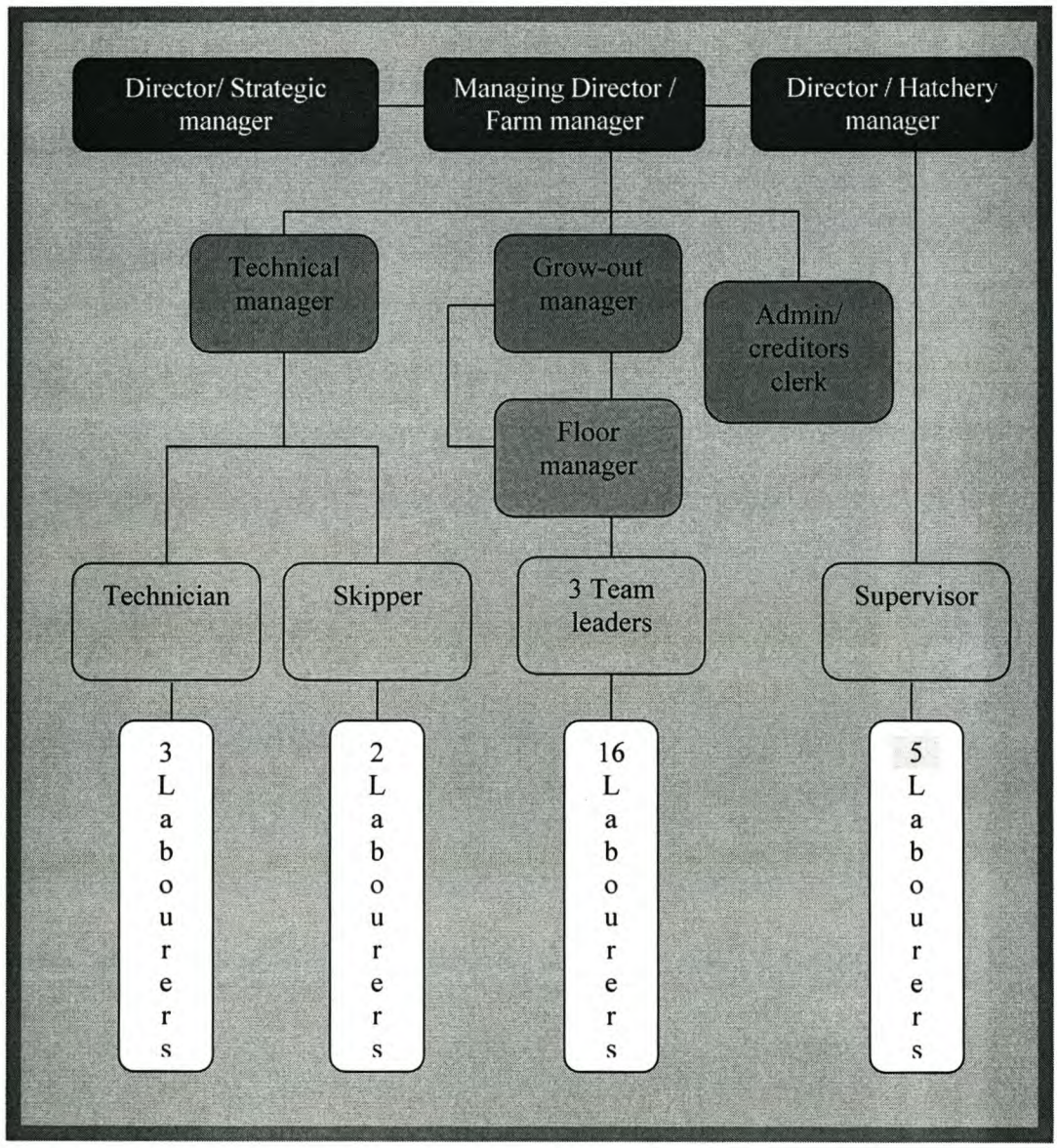


Figure 5.6 Organisation structure of Firm C

Firm C is owned and managed by three directors. Director One, who is in charge of the strategic management of the firm, is not involved in the normal

day-to-day running of the farm. Director Two is a qualified chemical engineer with an extensive background in wastewater management. He is both the managing director of the firm and the manager of the farm. Director Three is a scientist with a Master's degree in wastewater management. A technical manager, as well as a grow-out manager with a Master's degree in Marine Science, assists the three directors. Firm C has a total of 29 personnel. The firm does not have a back-up company. According to the managing director, the firm markets its products together with two other firms as a member of a marketing group.

5.5.4 FIRM D

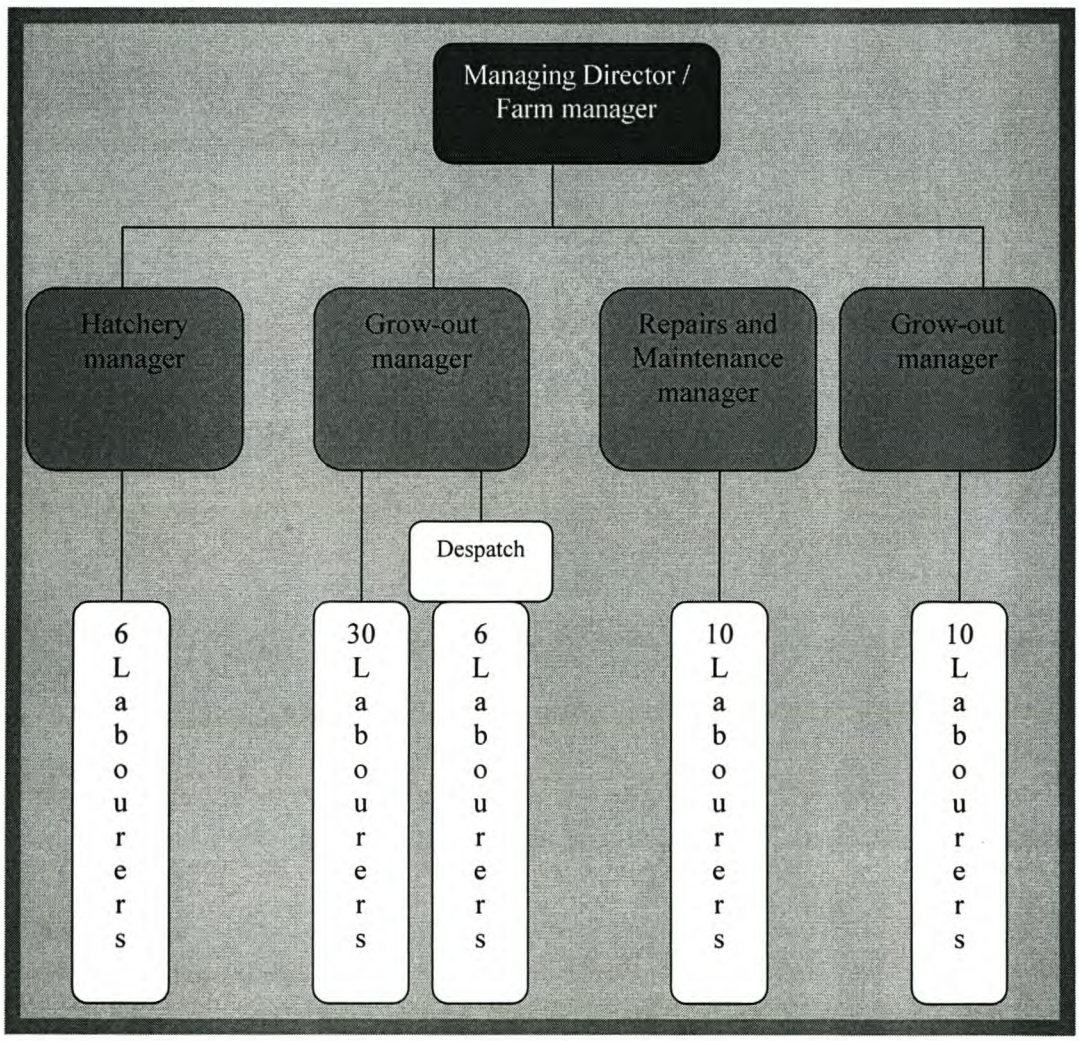


Figure 5.7 Organisation structure of Firm D

The managing director (farm manager) of firm D has been involved in the firm since its beginning more than twenty years ago. He is a professional diver and

uses his wide-ranging marketing experience to sell his abalone directly to hotels and offshore distributors. In his daily running of the farm, the manager is supported by two marine biologists, one in the hatchery and one in the grow-out division. He is also supported by a maintenance manager and a food production manager, as well as 62 general employees. Manager D, an accomplished marketer, sells his abalone directly to hotels and offshore distributors. The backup firm is not involved in the marketing of the cultivated abalone.

In the firm's history of more than twenty years, no one has ever been laid off and only one person has left his job prior to retirement. This is a reflection of both the good working conditions at the firm and the lack of employment opportunities in the area

5.5.5 FIRM E

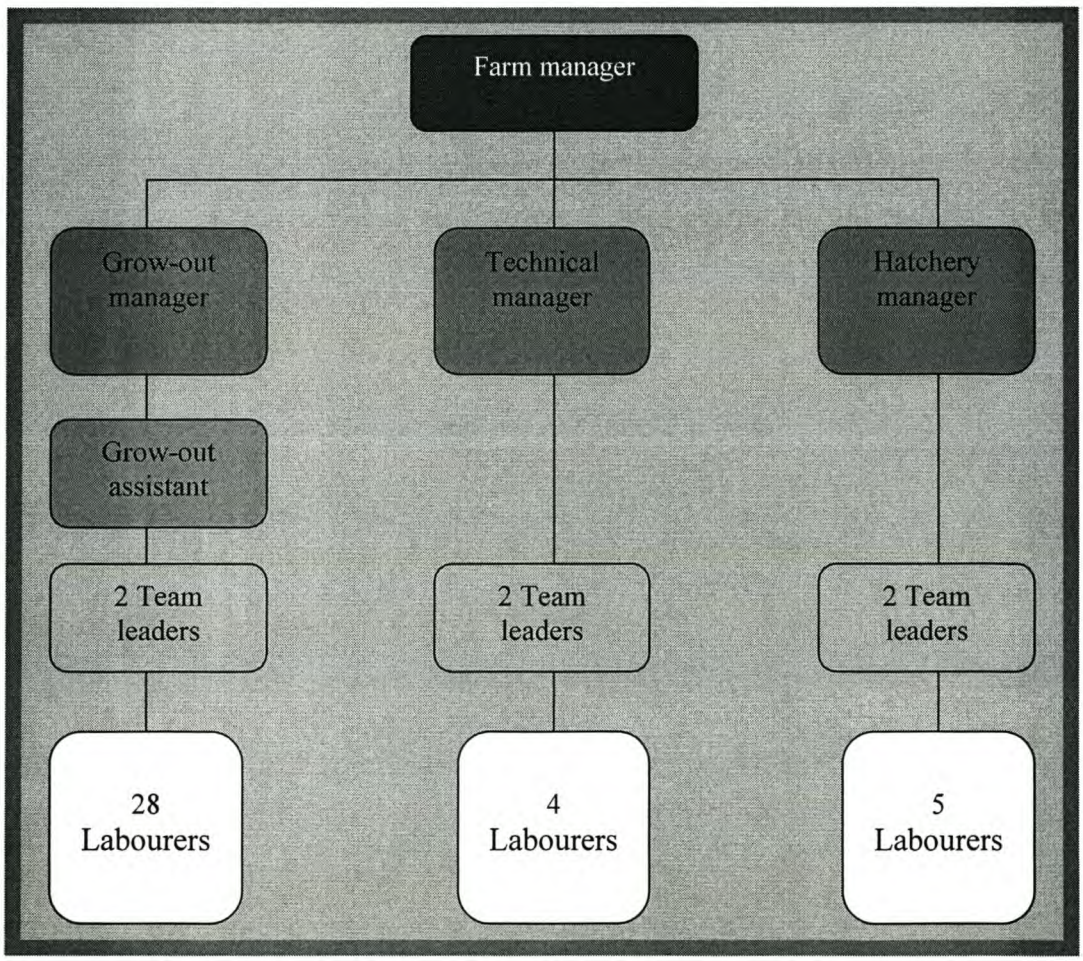


Figure 5.8 Organisation structure of Firm E

Farm manager E, a qualified mechanical engineer, started in his current position in 1992. Before that he was involved in the pelagic industry and up to three years ago also in the commercial abalone industry. The experienced gained in these industries are now used in the canning and marketing of the firms products. Farm manager E is proud to claim that he pioneered the export of live abalone in South Africa in 1991. The personnel at firm E include a biologist, two mechanical engineers as well as 45 other staff members. Backing is provided by a big corporate.

5.5.6 FIRM F

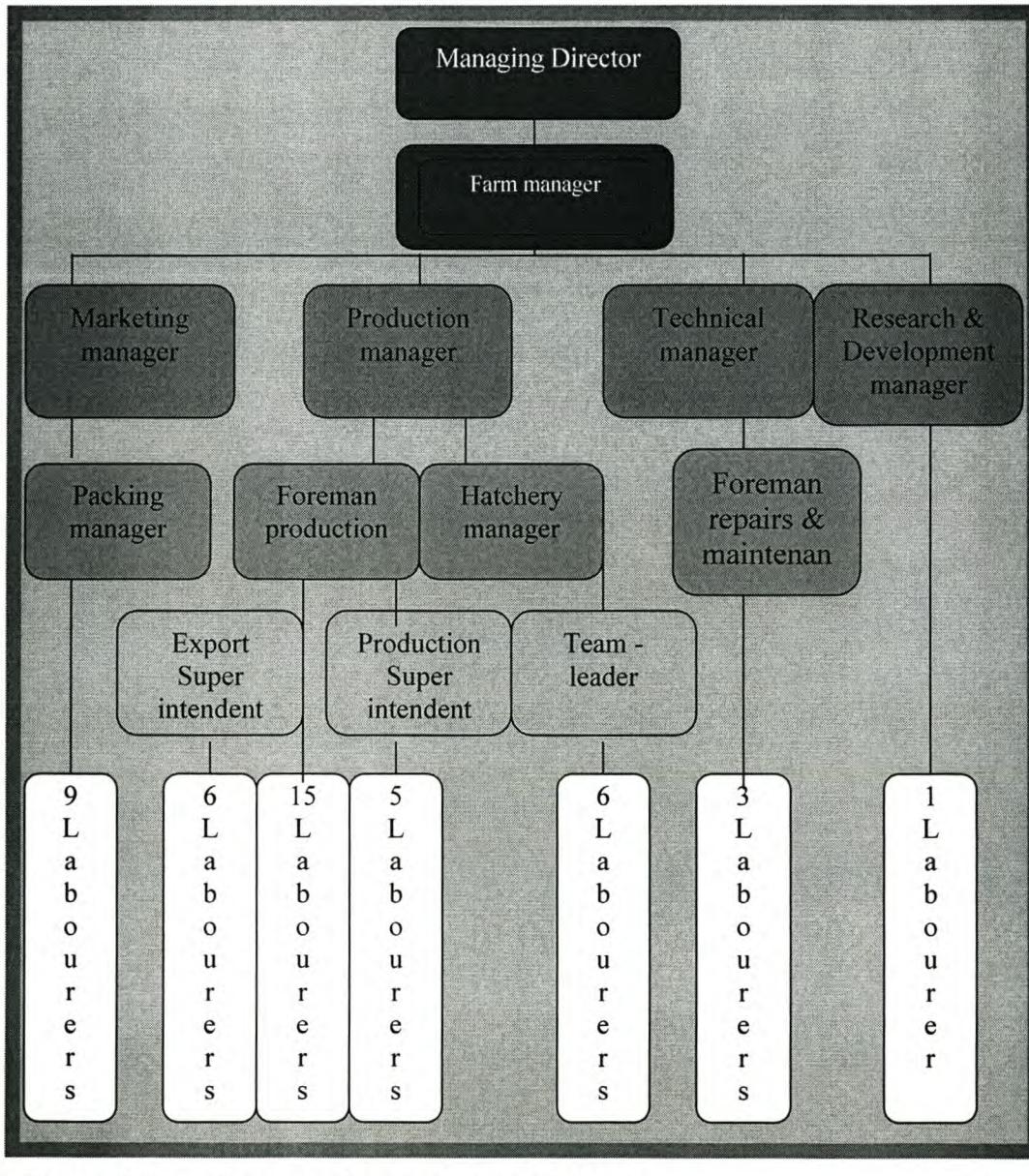


Figure 5.9 Organisation structure of Firm F

The managing director of firm F, a biologist, is not involved in the day-to-day running of the firm. The farm manager started at the firm in 2000 as a marketing manager after quitting his career as a qualified quantity surveyor. Even though he was promoted to general manager in 2003, he still views marketing as one of his key focuses. Both the production and hatchery manager started as labourers at the firm and were promoted to their current positions. Firm F, backed by a corporate, provides jobs for 60 personnel.

5.5.7 FIRM G

According to the representative of Firm G, direct line functions have a strenuous affect both up- and downward. At this firm they seek to avoid such authority line functions. The representative therefore chose not to draw an organisation chart, but rather to explain the firm's organisational structure. Although not all the personnel were included in the explanation, it provides an excellent impression of the firm's structure and strategy.

The firm has an executive management consisting of four members, as well as a structure of fifteen managers. The members of the management committee are a veterinarian, a chemical engineer, an ex-farm manager with an agriculture degree, and an accountant. The fifteen managers are all labourers that came up through the ranks. They are able to use their own initiative to appoint or fire their labourers. The executive management and the security and administration personnel are there to support the managers. But the managers do the work. The general labourers are a mixture of African, White and Coloured personnel.

The veterinarian was the first individual to start an abalone venture in South Africa back in 1984. His initial idea was not to establish a commercial enterprise, but to reseed the ocean. The accountant does not have a mariculture background and only joined the firm four months prior to the interview. The chemical engineer has both an honours degree in Industrial Engineering and a Master's degree in Business management. The ex-farm manager joined the firm four years ago. He has twenty years' experience on large (non-mariculture) farms.The forerunner of the present firm was the second enterprise to obtain a license to farm abalone. Firm G is not backed by a large corporate and sells its products directly to overseas clients.

5.5.8 FIRM H

Firm H started in 1997. The present farm manager, a marine biologist has been at his current firm since its beginning. Before 1997 he worked as a research coordinator for the national research foundation.

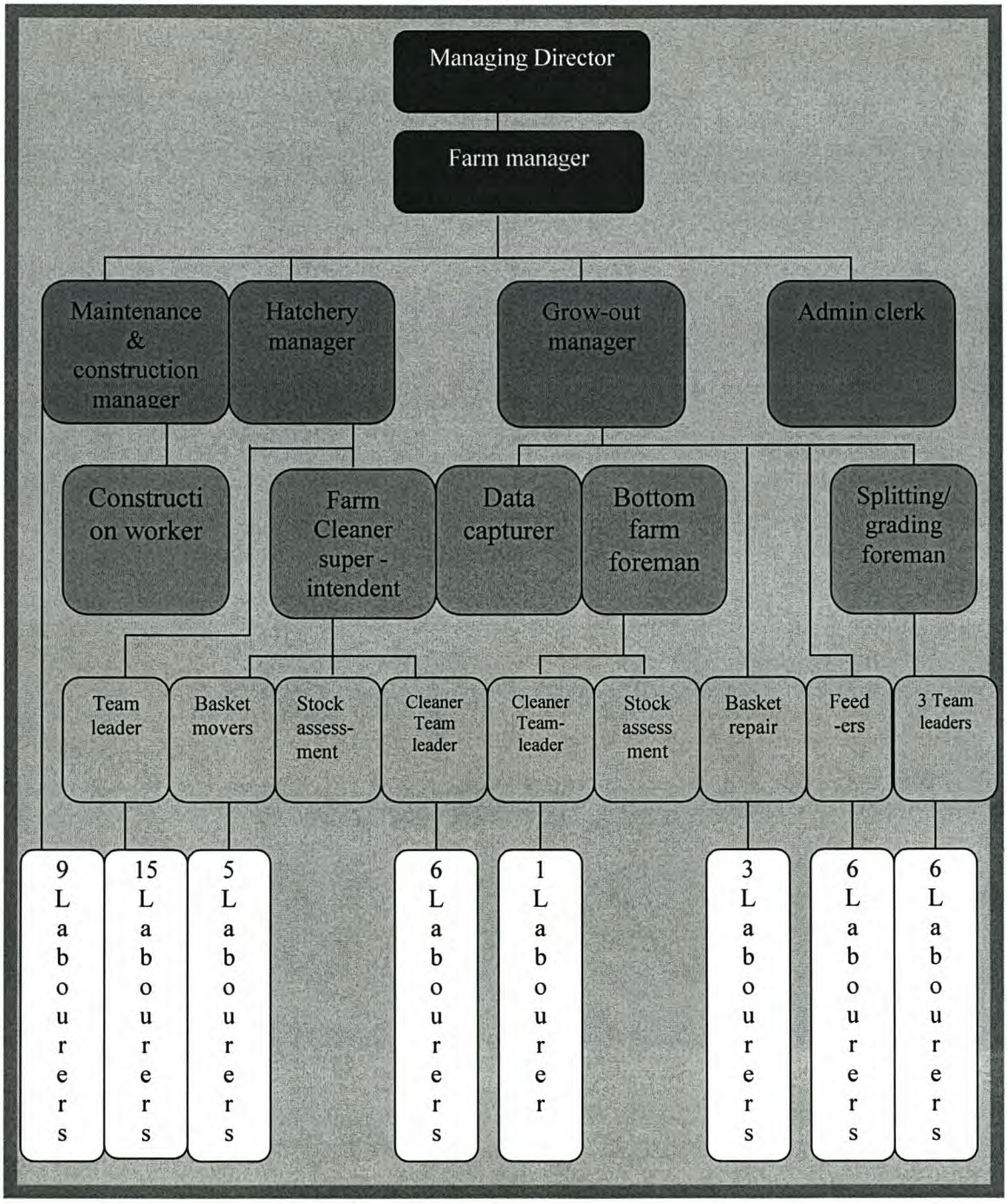


Figure 5.10 Organisation structure of Firm H

His responsibilities involved looking at the marine research program of the National Research Foundation for all the universities in South Africa. One of

the programs in which he was involved, an aquaculture/mariculture program, examined the technology and methods for growing South African abalone. The manager is not directly involved in marketing. The grow-out manager, a qualified civil engineer, began at the firm in 1998.

The construction manager, also a civil engineer, joined him in 1999. After completing his studies, the hatchery manager went to Global Ocean before joining the firm in 2001. Firm H has corporate backing, but the back-up company is not involved in marine-related activities.

5.5.9 FIRM I

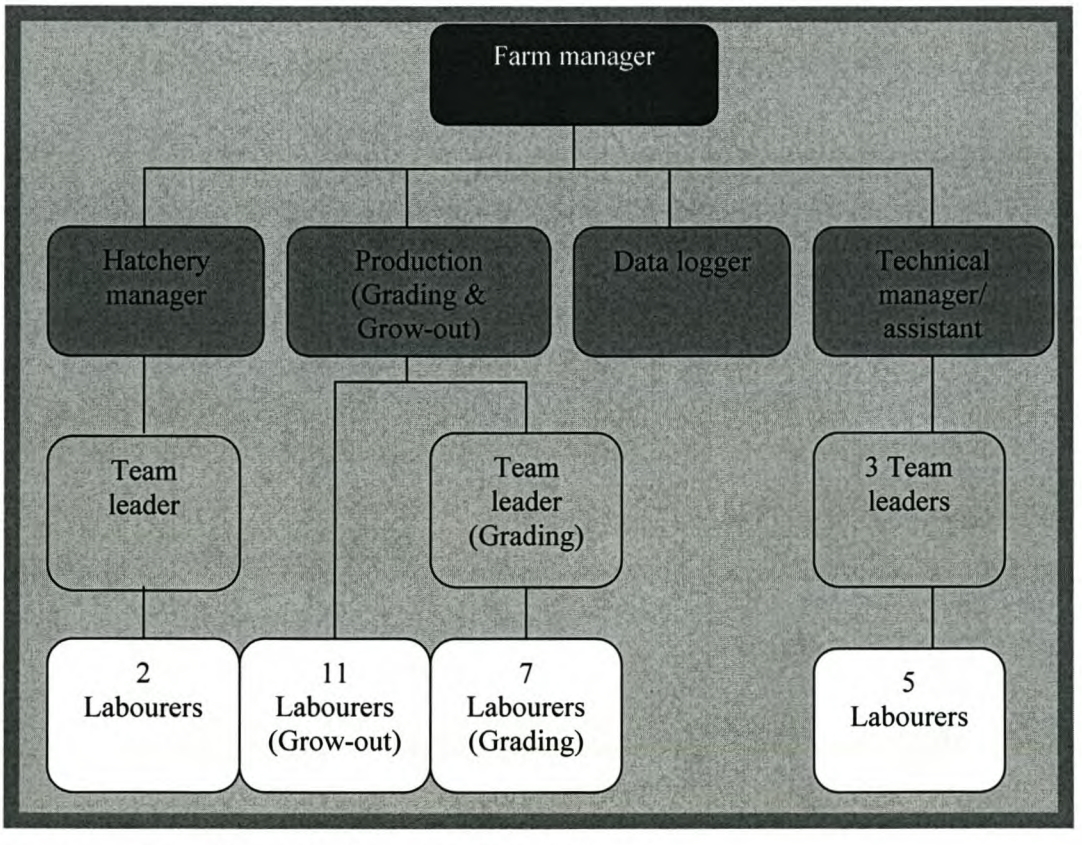


Figure 5.11 Organisation structure of Firm I

Firm I is backed by a large corporate. The manager of the firm worked at I&J Danger Point for one year and at HIK abalone for two years before he joined his current company in 1999. He completed an Agriculture degree at the University of Stellenbosch and is currently busy with an aquaculture course. The hatchery manager worked at I&J for five years, he started as a general labourer and was promoted to the position of researcher. The production supervisor joined the

firm four years ago, before which he was still in school. A technical manager, data logger and twenty-five general employees assist them.

5.5.10 FIRM J

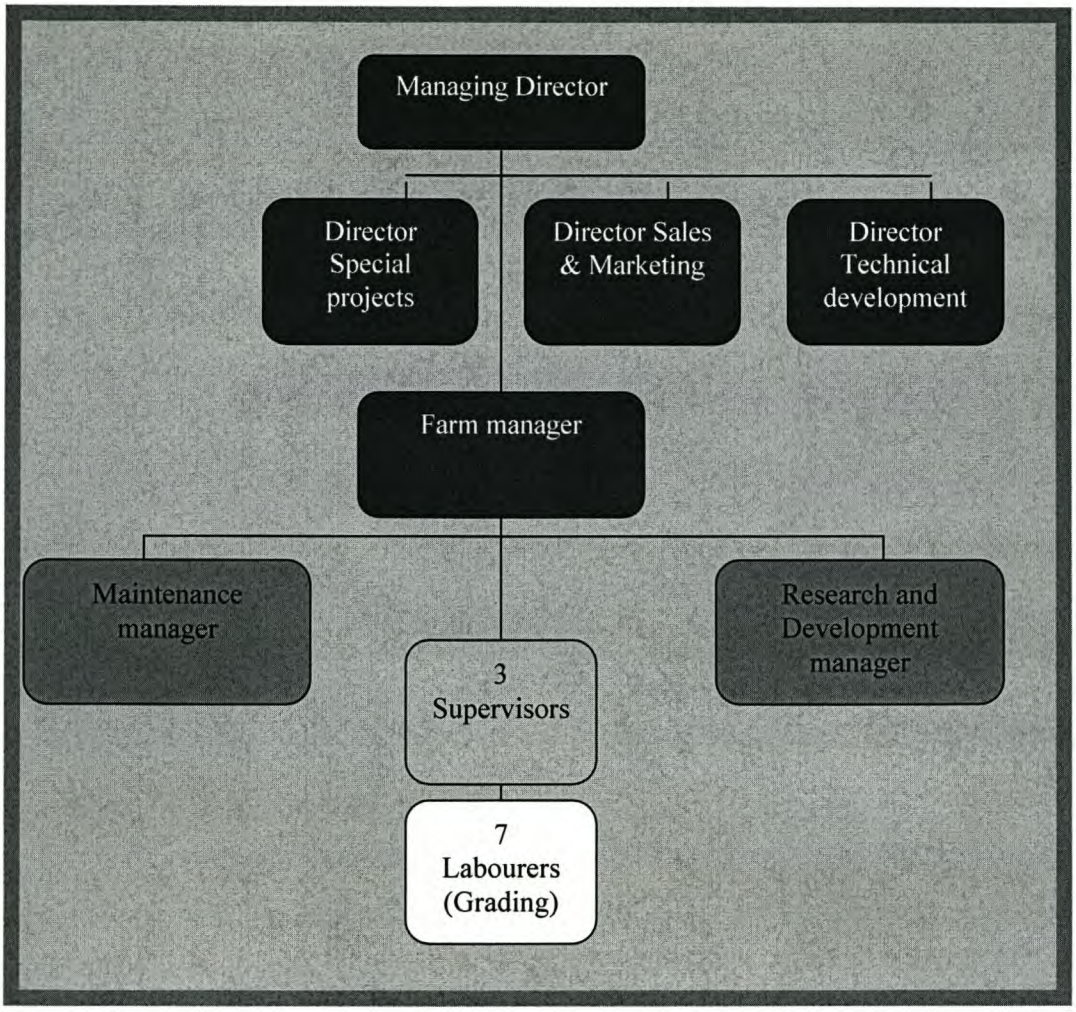


Figure 5.12 Organisation structure of Firm J

The managing director of the firm worked at Abagold for four years before joining the present firm two years ago. He has both an MSc in Zoology as well as a Master's degree in Business Administration. The sales and marketing manager and the special project manager founded the firm in 1997/1998. Both of them are primarily involved on the engineering side of the firm. (The firm does not market its own product.) The technical development director has 30 years of experience in water filtration. None of the above-mentioned personnel are involved in the daily running of the farm. The farm manager joined the firm in 2001. He has an honours degree in Fisheries Science/ Aquaculture and has worked throughout South Africa and the Mediterranean in both fresh and

seawater fish. The research and development manager joined the firm in 2003; he spent most of his time on non-abalone research (e.g. fish culture). The maintenance manager has been at the firm for five years. The three supervisors are all general labourers that have moved up through the ranks. According to the representative, they have a slightly lower staff compliment (17 in total) because of the water re-circulation system that they use. The firm is not backed by a large corporate.

5.5.11 Overview

According to all the respondents, it is easier for the managers of cultivation firms without large corporate backing to use their individual initiative. Firms with backing, on the other hand, apparently have better structured tools for decision making. As the organisation levels of these firms (see Table 5.5) were examined only from the farm manager level downwards, it is clear that they also have more direct line functions than their counterparts.

Table 5.5 Organisation levels in South African cultivation firms

Firm	Levels	Management levels	Top managers	Junior managers
A	5	2	1	6
B	3	1	3	0
C	4	2	3	4
D	3	1	4	0
E	5	2	1	3
F	6	2	2	4
G	-	-	-	-
H	5	2	2	4
I	4	2	1	4
J	4	2	5	2
Average	**4.33**	**1.78**	**2.44**	**3**

5.5.12 Interpretation

The training, background and orientation of the leaders of all ten firms differ significantly. Nine of the ten firms chose a hierarchical organisation style, whereas the tenth chooses a team based approach. Managers of four of the ten firms deal directly with their offshore clients and seven of the firms have corporate backing. Only two of the back-up companies of these firms are actively involved in the marketing of their firm's products. It therefore seems as though the backing of a large corporate company are not necessarily an advantage in the marketing of cultivated abalone.

The expertise required at a middle management level is specialised in fields such as marketing, production, research, logistics and engineering. Hence firms are required to delegate decision-making to each field of specialisation, where well-trained or experienced personnel are employed to carry responsibility. This strategy of delegating decision-making is a significant source of competitive advantage for the industry.

Regarding rivalry, the situation is interesting. Six of the ten respondents indicated that they did not see one another as rivals. They do not compete with one another but with Australia, New Zealand, Taiwan and other abalone producing countries (see Chapter Four: 55). However, since the firms are likely to be forced to seek more advanced and ultimately more sustainable sources of competitive advantage, the degree of rivalry is also likely to increase. Such a change can only be healthy for the industry, as Porter (1990c) argues that high local rivalry results in less global rivalry.

5.6 CHANCE

The role of chance as caused by developments such as new inventions, breakthrough technology, external political shocks, wars, oil shocks, significant changes in world financial markets and major shifts in foreign market demand can have a major impact on the competitiveness of an industry. The South African abalone industry is however still young and chance events have not been a major factor.

Porter (1990a) did not list fluctuations in exchange rates as a chance event. This is because one of his aims in his 1990 volume was to challenge the conventional view that competitiveness in knowledge-intensive industries is determined by exchange rates (Porter, 1990b: 190). Over the past two years, however, South Africa's currency has fluctuated a great deal. In August 2003, a time when the Rand stood at 7.30 to the dollar, one respondent explained that *"...being a high profit margin business, [in which] profit is basically purely linked to exchange rates, we feel very heavily when the rand changes. It is something we cannot control and right now it is a difficult time for abalone producers..."* Most of the respondents, however, felt that the industry would only be in severe trouble once the Rand hit a low of 6.00 against the dollar. In addition, they indicated that they would not advise anybody to join the industry right now, but rather to wait until the rand weakens again.

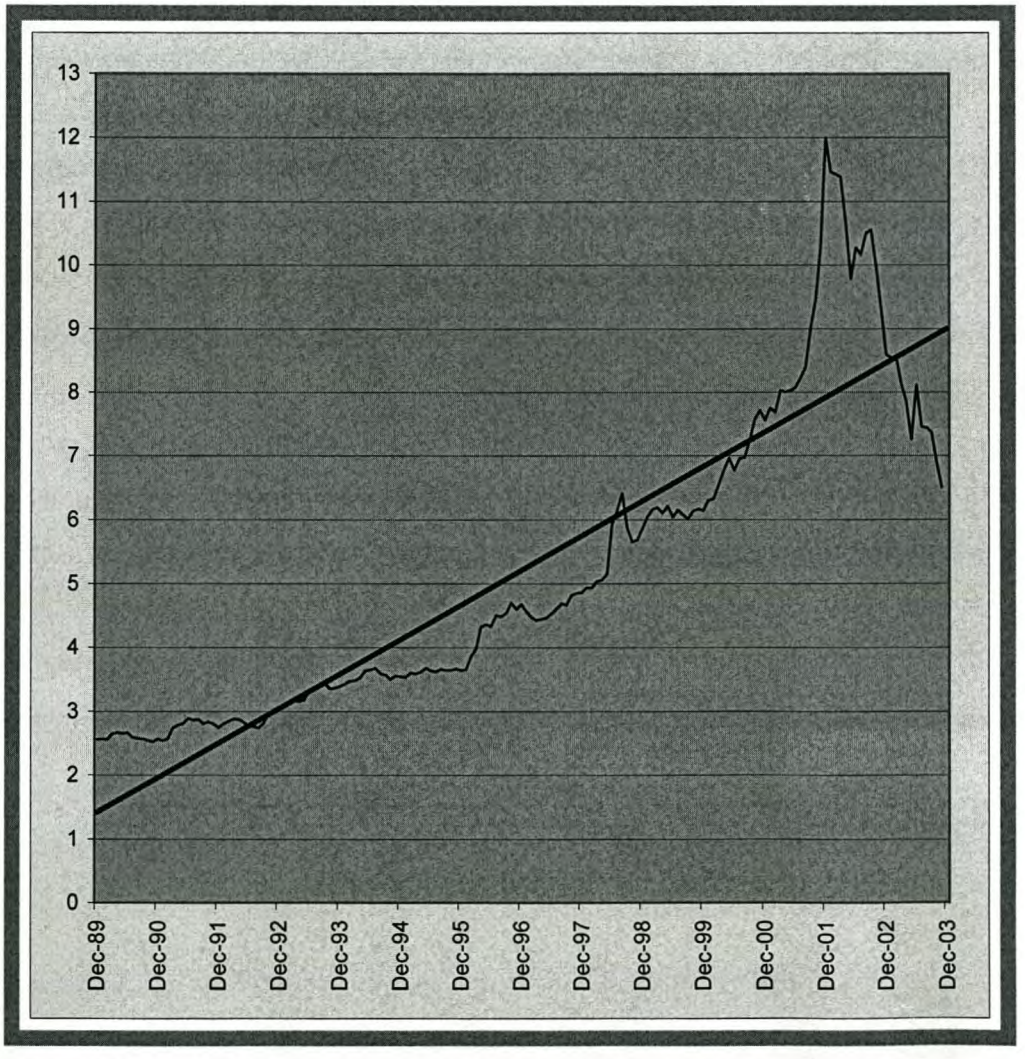


Figure 5.11 Thirteen year Rand Dollar exchange rates

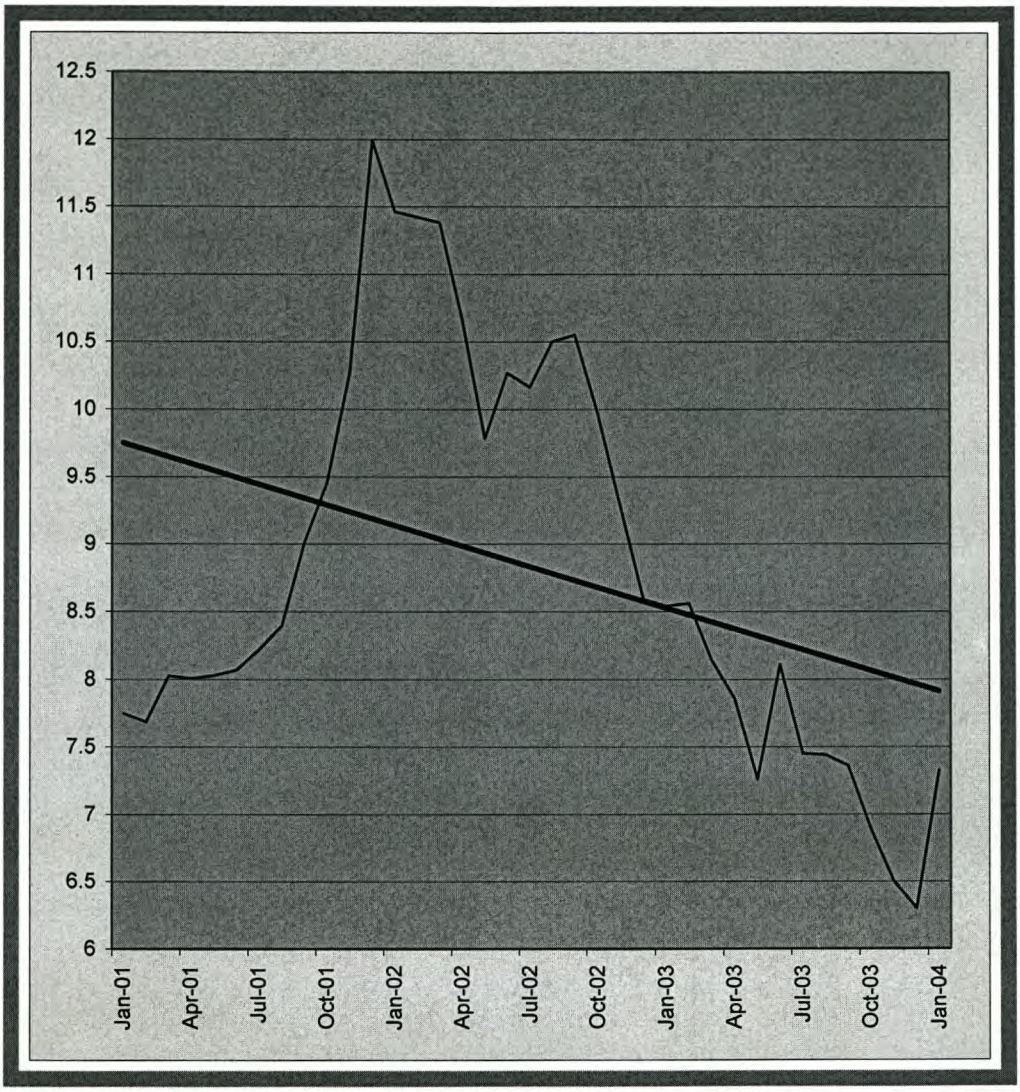


Figure 5.12 Short term Rand Dollar exchange rate

As mentioned in Chapter Four, the quantity of abalone produced on South African farms increased from 201 tons in 2000 to 519 tons in 2002. In this period the cultivated abalone industry was thriving. The annual average for the Rand went from R8.60 to the dollar in 2001 to R10.54 in 2002. It reached a record low level of R13.86 to the dollar, R20.08 to the pound and R12.47 to the Euro on 20 December 2001 (Summit, 2003). However, if a trend line is fitted to the exchange rate from the beginning of the 1990s to the beginning of 2003, this devaluation of the rand in 2001 appears to be a major deviation from the normal trend (see Figure 5.11). The strong recovery of the Rand in 2002, a year in which the Rand was the best performing currency against the US dollar, may therefore be a correction to the abnormal fall in 2001 (Ariovich, 2003). Consensus Economics, an international economic survey organisation that surveys over 250 economists in countries around the world for their view on

more than 90 currencies every month, projected in their November 2003 survey that the 2004 annual average of the rand would be R7.50 to the dollar. For the first 6 months of 2003, the rand averaged at R8.00 to the dollar after briefly weakening to above the R9.00 level in January 2003 (Finance24, 2003). Vivian Taberer, Investec Asset Management portfolio manager, echoes the view of Consensus Economics and adds that the present levels of the rand against the dollar (November, 2003), is due more to the dollar's weakness than the rand's strength (Summit, 2003).

Though the future direction and fluctuations of the South African currency is unknown, the respondents felt that the fluctuations over the past 24 months (see Figure 5.12) has led them to search for more cost-effective production methods. Being based in South Africa over the last two years and consequently experiencing a highly fluctuating currency can therefore be seen as a competitive advantage.

5.7 GOVERNMENT

To assess the role of Government in the cultivated abalone industry, the representatives were asked, "*What role did government play in the international competitiveness of your firm*?"

5.7.1 Government in general

The following ten statements were extracted from the first two sentences of the ten representatives' answers. Each statement was made by a different representative.

- "*Negatief, gesukkel om uitvoerpermitte te kry*" *[*Negative, struggled to get export permits.*]*
- *"Niks, hulle het net 'n belemmerende rol gespeel, hoofsaaklik deur M&CM."* *[*Nothing, they have only played an obstructive role, mainly through M&CM.*]*
- *"We are being strangled by government."*
- *"It is really from a regulatory point that they influence things on the farm".*

- *"Regering, nie veel nie."* [Government, not much.]
- *"The government has not done much to facilitate aquaculture or mariculture. The Department of Agriculture is currently taking the role as lead agency and drafting an aquaculture policy."*
- *"Regering het ons nog nooit gehelp met enigiets nie. Hulle het in ons pad gestaan elke stap wat ons geneem het."* [Government has never assisted us in anything. They have stood in our way at every step that we took.]
- *"Owerheid het nog nêrens gehelp nie..."* [Government has not helped us in any way.]
- *"Hindering, nothing positive..."*

In addition to this negative criticism, most of the representatives also had mostly negative opinions of M&CM, the South African bureau of Standards (SABS), and the Department of Trade and Industry (DTI). This view of the abalone producers that the government does not support them could affect their competitive advantage negatively.

5.7.2 Marine and Coastal Management

The following nine statements were made concerning Marine and Coastal Management, a division of the Department of Environmental Affairs and Tourism, as mentioned earlier. All the statements come from different representatives.

- *"Hulle behandel ons soos kriminele, hulle funksie was nog altyd polisiëring."* [They treat us like criminals, their function has always been policing.]
- *"Sedert ons 'n marikultuur liaison vergadering met M&CM het, is dit baie beter. Twee jaar gelede was dit nog 'n nagmerrie."* [Since our mariculture liaison meeting with M&CM, things have improved considerably. Two years ago it was still a nightmare.]

- *"M&CM could do a lot to improve the service they are supposed to offer."*
- "*We would like them to consider what they do and how it influences us.*"
- "*M&CM is beter die afgelope twee jaar, maar daar is nog steeds skrapies, aangesien die struktuur opgebreek is en almal doen 'n klein bietjie. Partykeer is daar net misverstande, by tye is dit treurig, maar oor die algemeen is dit okay.*" [M&CM has improved over the past two years, but there are still little hitches, because the structure is fragmented and everybody does only a small bit. Sometimes there are only misunderstandings, at times it is hopeless, but in general it is okay.]
- "*M&CM het 'n departement wat mariene bioloë het. Hulle was nog nooit hier gewees nie. Hulle stel nie belang nie. Hulle sit in 'n kantoor en maak allerhande reëls. Die minister luister vir hulle, hulle luister glad nie vir die industrie nie.*" [M&CM has a department that has marine biologists. They have never been here. They are not interested. They sit in an office, making all kinds of rules. The minister listens to them, they don't listen to the industry at all.]
- "*I would like to see more control, instead of monitoring the downward trend of the wild abalone, I would like to see them do something to prevent it. In terms of allowing the farms to reseed the ocean or to maintain the resource.*"
- *"M&CM is baie behulpsaam." [*M&CM is very supportive.*]*
- "*The permitting issue should be streamlined.*"

According to the respondents, M&CM is at present attempting to set up an institute to service mariculture and has already set up a research facility at Sea Point. Disappointingly, they could not allocate funds to run research projects, with a result that all projects are still funded by AFASA. The respondents believe that it is M&CM's responsibility to take over both the shellfish monitoring programme and the veterinarian service that is currently paid for by AFASA. They would like to see M&CM establish a liaison officer that can facilitate with permit applications - giving advice and contacting all the various

government institutions on the applicant's behalf. They want M&CM to consider them in decisions that could influence the cultivated industry, for example by placing abalone on CITES (see Chapter One: 11). In collaboration with the Department of Trade and Industry and/or the Department of Agriculture, M&CM could also help to develop training programmes for aquaculture.

5.7.3 South African Bureau of Standards (SABS)

In terms of the Standards Act, 1993 (Act No. 29 of 1993), the SABS is required to develop and disseminate standards, and to provide information and guidance on standards matters, so as to promote and maintain standardisation and quality (Standards South Africa, 2004).

All the firms examined, excluding the one at Port Elizabeth, pay the salary of an SABS officer. While most of the firms are pleased with the service they get from this official, they nevertheless feel that the service the SABS is supposed to provide can be seriously improved. According to one respondent, the SABS went "*from being a body that should literally try to promote or get you in a position where you can go and sell the stuff, you now feel that you are actually being strangled and that you cannot do anything without them, [or] it is going to cost you a fortune.*" Another felt that the inability of the SABS caused many preventable problems.

The respondents' advice to the SABS is:

- to set up a sampling program that will service the complete shellfish mariculture industry (abalone, oysters, mussels) subsidised from their other operations – currently AFASA is paying for this entirely;
- to become more 'industry' friendly, instead of being the control dictator that it currently is.

5.7.4 Department of Trade and Industry (DTI)

Only five of the interviewees commented on the role that the DTI plays in the competitiveness of the cultivated abalone industry. Each one of the following five statements was made by a different representative.

- "*DTI moet SA perlemoen oorsee promote... as hulle hulle doele in orde gehad het, kon ons al twintig plase soos hierdie in Suid-Afrika gehad het.*" [DTI is suppose to promote SA abalone abroad… if they had had their goals in order, we could have had twenty farms like this one in South Africa]

- *" ('n Persoon) het jare gelede van die DTI sensus gebruik gemaak. Rompslomp om geld te kry, meer geld gekos om geld te kry as wat ons sou geld kry.*" [(A person) made use of DTI a few years ago. There was a lot of red tape, it cost us more money to get the funds, than we would have received.]

- *"The DTI could also do a lot to improve what they are offering, because they are there to promote industry. In February 2001 DTI had a road show promoting their aquaculture grant, and it still does not exist."*

- *"I used funds, they asked me to go on one of those trade missions and I went on that, they paid me to go over there. There is a whole lot of people who want to buy your product; but if you do not have the product... At the moment we have orders that far exceed our production capabilities and that of the farms that we market for."*

- *"Promotions and marketing... DTI, I think they do assist."*

Although not all the respondents felt that the DTI should necessarily assist them with promotions, marketing and foreign delegation, some felt very strongly about it. In addition, respondents wish for either DTI or the Department of Agriculture

- to complete the Aquaculture policy in conjunction with the Aquaculture Association of South Africa, and

- to finalise Aquaculture legislation in conjunction with M&CM.

5.7.5 Interpretation

The statements made by the interviewees on the role of government in the competitiveness of the South African cultivated abalone industry are all indicative of either an uninvolved or unconstructive government. This is further reiterated in the interviewees' opinions on the role of Marine and Coastal

Management (6 negative, 2 neutral and 1 positive) and the Department of Trade and Industry (3 negative, 1 neutral, 1 positive). Although the majority of the respondents are content with the service they get from the SABS, they still feel that it can be more industry-friendly. It therefore seems that being based in this country with this government does severely decrease the competitiveness of the South African cultivated abalone industry.

5.8 RANKING OF THE FIFTEEN FACTORS

As mentioned in Chapter Three, the respondents were asked to rate the importance of those factors identified by Esterhuizen and others (2001) as having the prime impact on the competitive success of South Africa's agro-food and fibre complex. If a factor was very important, it received 3 marks, if it was considered important, it received 2 and if it was less important, it received one. The aim was to determine how important the factors that influenced other sectors are in the cultivated abalone industry. Due to time constraints, only nine of the respondents were able to complete the form (see Table 5.6).

The respondents indicated that, of the 15 factors, the quality of their products (i.e. value for money) has the most important influence on the competitive success of their firms. This is followed by managerial capabilities, which is rated as the second most important factor. The cost of capital, the cost of production and the sustainability of suppliers, are all considered to be equally important, and together take the third position. Crime, the quality of physical infrastructure, labour regulations, and labour costs are rated only as the ninth, twelfth, fourteenth and fifteenth most important out of the given fifteen factors. Since they are externally manipulated factors over which agribusiness has relatively little control (Esterhuizen and others, 2001), it is fortunate that they are not considered more important. Product quality, managerial capacity and cost of production, however, which can be manipulated to a large degree, are rated as the most important, and second and fourth most important factors respectively.

An important firm level strategy will thus focus on the following operational aspects over which a firm has some control:

Table 5.6 Rating of the 15 factors identified by Esterhuizen and others (2001)

Factors	Very Important	Important	Less Important	Score
1. Quality of products	9	0	0	27
2. Managerial capabilities	8	1	0	26
3. Cost of capital	7	2	0	25
4. Cost of production	7	2	0	25
5. Sustainability of suppliers	7	2	0	25
6. Pricing strategy of companies	5	4	0	23
7. Competitiveness of suppliers	4	5	0	22
8. Availability of capital	4	4	1	21
9. Crime	3	5	1	20
10. Market power of buyers	5	1	3	20
11. Local economic stability	3	5	1	20
12. Quality of physical infrastructure	4	3	2	20
13. Local market growth	2	3	4	16
14. Labour policy	3	6	0	15
15. The cost of skilled labour	0	5	4	14

➧ **Management**

Though the firms rated their managerial capabilities as highly competent, it is also clear that the firms are concerned about the sustainability (5^{th}) and competitiveness (7^{th}) of suppliers, to be exact, the suppliers of kelp. As

government has granted kelp consession rights only to a few entities, none of which own any abalone farms, it is very difficult for the cultivation industry to deal with this matter adequately.

- **Cost of production**

The cost of production was rated as very important by seven of the nine respondents, whilst the remaining two indicated that it was important. As the cultivated abalone industry is still young, it can be expected that production costs will decrease, as production methods are refined.

- **Policy**

The management of external factors such as cost of capital (3rd), crime (9th), quality of infrastructure (12th), the home market situation (local market growth, 13th), will always be important in any industry. No clear aquaculture policy exists at present, but according to a respondent the Aquaculture Association of South Africa together with DTI and Department of Agriculture is busy drafting one. A comprehensive policy, implemented well, will offer firms in the aquaculture industry a more constructive environment to function more competitively.

5.9 CONCLUSION

In the attempt to assess the competitive advantages and disadvantages resulting from the locations (countries) where the firms are based, Porter's diamond model was used in this chapter to evaluate factors of production, local demand conditions, related and supporting industries, firm strategy, structure and rivalry, chance events and government. Of these, factor conditions, related and supporting industries, firm strategy, structure and rivalry, and chance events indicate that being based in South Africa is a competitive advantage for abalone cultivation firms. On the other hand, the demand conditions in the market, as well as the local government, distract from this advantage. It will therefore depend on the interplay among these factors whether the industry develops significantly in the nearby future. This is discussed in further detail in Chapter Six.

CHAPTER SIX
CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

South Africa's competitive position in the international abalone arena is not only affected by the total supply-demand ratio of abalone, but even more so by the supply-demand ratio of the preferred abalone species. While the demand for the desired *H. discus hannai* currently exceeds its supply, a number of countries, such as Chile, Ireland and Hawaii, have also recently started to produce this species. When these countries, along with Japan, produce enough *H. discus hannai* to supply the demand fully, the price of this country's *H. midae* (a slightly less preferred species) may be greatly reduced. In addition, Marine and Coastal Management are considering listing abalone on Appendix III of CITES, which could adversely affect the industry. It is therefore possible that South Africa's position in the cultivated abalone arena is not completely positive.

The aim of this study was to investigate the national competitive advantage of the South African cultivated abalone industry and the environment in which it operates. Secondary aims included, describing the role-players in the industry and identifying ways in which the industry can be made more competitive.

6.2 PORTER'S COMPETITIVENESS MODELS

Achieving the above-mentioned aims required a conceptual framework involving Porter's Five Forces analysis and Diamond Model. The Five Forces analysis is a tool used for the appraisal of overall industry competition and for exploring barriers to entry, rivalry, customer power, substitution and the power of suppliers. The Diamond Model, on the other hand, offers a framework for assessing the competitive advantages and disadvantages resulting from the locations where firms are situated. It evaluates demand conditions, related and supporting industries, factor endowments, the role of government, chance events, firm structure and strategy, as well as local rivalry. Collaboratively, these two models offer a comprehensive tool for assessing the competitiveness of most industries.

6.3 CONCLUSIONS

With so many assumptions and possible misinterpretations of data it is often difficult to accept the conclusions of economic models with confidence, especially when so many of the results are counterintuitive. Indeed, one of the most difficult aspects of economic analysis is to interpret the conclusions of models. Models are, by definition, simplifications of the real world and thus all economic models may contain unrealistic assumptions. Therefore, to dismiss the results of economic analysis on the basis of unrealistic assumptions means that one must dismiss all insights contained within the economics discipline. This is neither practical nor realistic. Economic models in general, and the two models of Porter in particular, do contain insights that can be applied to the more complex real world.

In Chapter Four, the South African cultivated abalone industry was analysed in terms of Porter's Five Forces analysis. The model was used to explore rivalry among existing competitors, the threat of new entrants into the industry, as well as the bargaining power of buyers and suppliers. The aim of the chapter was to determine the ultimate feasibility of the South African cultivated abalone industry. Based on the information derived from the model, the South African abalone cultivation firms can decide how to influence or to exploit particular aspects of their industry.

From the eleven factors employed to assess the rivalry among the existing competitors in the industry, five indicate a high level of rivalry in the South African cultivated abalone industry. Four are indicative of a low level, and two resist categorisation. While the demand exceeds the supply, the degree of rivalry in the industry is not likely to increase. If the industry acts pro-actively by promoting South African abalone, however, thus increasing the demand, rivalry is likely to decline. Since most of the respondents in this study did not see the promotion of South African abalone as necessary while demand exceeds supply, it seems likely that rivalry may well increase in the near future, given that world supply of farmed abalone is increasing. According to Porter's Five Forces

model, this could result in a decline in profits and could make the industry less attractive.

From the eleven factors employed to assess the threat of new entrants into the industry, six serve as significant barriers for new entrants to the South African cultivated abalone industry, and four do not serve as barriers, while no inference can be drawn from the role of economies of scale as barrier to entry. It would thus appear as though the industry is not as attractive to new entrants as was expected. However, if the demand for South African abalone increases, possible barriers, such as access to distribution channels and proprietary product technology, might well become less serious obstacles.

From the five factors employed to assess the bargaining leverage of buyers, two indicate that the overseas clients of South African abalone cultivation firms have some bargaining power. Three, on the other hand show that the level cannot be very high. Buyers' sensitivity to prices does not indicate who holds the most bargaining power. This finding contradict the views expressed by firms interviewed on how they experienced the bargaining power of buyers, which may be the result of the fact that South African producers do not make full use of their bargaining leverage. Increasing the demand for South African abalone by means of promotion, could decrease the bargaining power of the buyers of abalone. However, since only fifty percent of the respondents feel that the industry needs to promote South African abalone, the mind-set of the remaining respondents could lead to a substantial reduction in the price of South African abalone should the Asian markets become more saturated.

From the six factors employed to assess the bargaining power of kelp buyers, three indicate a high level of bargaining power for the kelp suppliers. Two are indicative of a low level of bargaining power, and one is not indicative of bargaining power. In brief, this signifies that the kelp suppliers hold a substantial degree of bargaining power. As more and more firms commence production or increase the production of their own kelp, however, the lower their bargaining power will become. In other words, the bargaining power of the kelp industry is not likely to distract from the attractiveness of the South African cultivated abalone industry in future.

From the six factors employed to assess the bargaining power of the buyers of Abfeed®, the only South African artificial diet for abalone, only one indicates that the supplier could hold substantial bargaining power. Three are indicative of a low level of bargaining power and one is not indicative. In brief, this signifies that the supplier of Abfeed® does not hold substantial bargaining power. However, if the second local diet supplier does not make its appearance or its quality is inferior to that of Abfeed®, or if the new 'astonishing' imported diet does not prove to be as astonishing as initially suspected, the bargaining power of the supplier of Abfeed® could increase.

In brief, the thesis attempted to determine the ultimate means of enhancing the competitiveness of the South African cultivated abalone industry. For this purpose, Porter's Five Forces analysis was used to explore rivalry among existing competitors, the threat of new entrants into the industry, as well as the bargaining power of buyers and suppliers. Of these, the low threat of new entrants and the low bargaining power of artificial diet suppliers indicate that the abalone industry should be attractive to investors. On the other hand, the degree of rivalry among existing competitors and the strong bargaining power of kelp suppliers are factors that could make the industry less attractive. This, and the fact that the bargaining power of buyers was found to be not indicative of the attractiveness of the industry at all, signifies that the cultivated abalone industry is able to make reasonable profits and is thus a moderately attractive industry. By promoting South African abalone and thus not only reducing the possibility of rivalry, but also increasing the bargaining power of South African producers on international markets, the industry appears to have the potential to become more attractive.

The analysis of an industry would be more comprehensive if both Porter's Five Forces Model and the Diamond Model are applied, as argued in Chapter Two. Chapter Five examined the South African cultivated abalone industry in terms of the Diamond Model (Porter, 1990), which was employed to evaluate factors of production, local demand conditions, related and supporting industries, firm strategy, structure and rivalry, chance events and government. The primary aim of the analysis was to assess how the fact that the abalone firms are located in South Africa bears on the competitive advantages and disadvantages of the

industry. Secondary aims were to outline the structure and strategies of the different firms and to explore the related firms in which the abalone cultivation firms and/or their holding companies are involved.

The evaluation of factor conditions revealed that firms based in South Africa could replace their highly educated personnel without difficulty. This, together with the country's various research institutions, gives the South African abalone industry a strong competitive advantage. The appraisal of demand conditions revealed that South Africa does not have consumers able to encourage innovation among the local abalone firms. This, in Porter's view would be a competitive disadvantage for abalone cultivation firms based in South Africa. AFASA and the M&CM have indicated an intention to change the legislation prohibiting the local sales of cultivated abalone.

Four abalone fishing and processing industries as well as six marine related back-up companies were examined in the related and supporting industries section. Among the four abalone fishing and processing industries examined, two (i.e. commercial fishing and abalone processing sector) could co-ordinate and share activities in the value chain with the South African cultivated abalone industry, and two (poaching, recreational abalone fishing) could not. All six marine-related backup companies can co-ordinate and share activities with their abalone cultivation farms. While some of the respondents said that they preferred to perform activities, such as marketing, without the assistance of their backup companies, the large number of industries able to co-ordinate and share value chain activities with the abalone farms in South Africa is, according to Porter's theory, a competitive advantage for abalone cultivation firms based in South Africa.

The section on firm strategy, structure and rivalry explored the organisational structure of firms as well as the training, background and orientation of its leaders. This showed that the expertise required at a middle management level is most often specialised in fields such as marketing, production, research, logistics and engineering. Hence, firms are required to delegate decision-making to each field of specialisation, where well-trained or experienced personnel are employed to carry responsibility. This strategy of delegating decision-making is a significant source of competitive advantage for the industry.

Since firms are likely to be forced to seek more advanced and ultimately more sustainable sources of competitive advantage (e.g. market or demand pull and improved technology), the degree of rivalry in the industry is also likely to increase. According to Porter's Diamond Model, such a change can only be healthy for the industry. According to Porter's Five Forces analysis, however, this would result in declining profit margins. While a firm might prefer less rivalry, more local rivalry is better in the long term as it puts pressure on firms to innovate and improve. In a New Zealand address, Porter (1990c) proclaimed that high local rivalry results in less global rivalry, which means that intense rivalry is a positive attribute that contributes to the international competitiveness of an industry.

The South African abalone industry is still young and chance events have not been a major factor. Porter (1990a) did not list fluctuations in exchange rates as a chance event. Over the past two years, however, South Africa's currency has fluctuated a great deal, and was consequently considered to be such an event. The respondents felt that the fluctuations had caused them to search for more cost-effective production methods e.g. feed and stocking practices. Being based in South Africa and consequently experiencing a highly fluctuating currency can therefore be seen as a competitive advantage. Environmental risks are considered manageable and thus not included as chance events.

The opinions of the respondents were employed to analyse the role of government in the competitiveness of South African abalone cultivation firms. Everybody agreed that government was either not involved in the industry or that its involvement distracted from the competitiveness of the industry. These views were reiterated in statements on the role of Marine and Coastal Management and the Department of Trade and Industry. Although the majority of the respondents are content with the service that they receive from the SABS, they feel that it could be more industry-friendly. It appears that the lack of appropriate government supports retards the competitiveness of the South African cultivated abalone industry.

In an attempt to assess the competitive advantages and disadvantages resulting from firm locations (countries), Porter's diamond model was used to evaluate factors of production, local demand conditions, related and supporting

industries, firm strategy, structure and rivalry, chance events and government. Of these, factor conditions, related and supporting industries, firm strategy, structure and rivalry, and chance events indicate that being based in South Africa is a competitive advantage for abalone cultivation firms. On the other hand, the demand conditions in the market, as well as the local government, detract from this advantage. It will therefore depend on the interplay among these factors whether the industry develops significantly in future.

6.4 RECOMMENDATIONS

6.4.1 Recommendations based on the Five Forces analysis of the South African cultivated abalone industry

- **Rivalry among existing competitors**

The escalating world supply of farmed abalone will result in increased local rivalry. According to Porter's Five Forces model such an increase could result in a decline in profits making the industry less attractive. In order to avoid this, the industry has to increase the demand for South African abalone through co-operative promotions.

- **Threat of new entrants**

The easier it is for new enterprises to penetrate the industry, the lower the present firms' stake of the industry's potential profits will be. In an attempt to decrease this threat, individual abalone firms could bind their employees contractually for a period of time after they have left the firm, thus preventing them from joining other abalone ventures. In addition, the members of AFASA could make a decision not to accept new members. This approach is however not sensible, as the AFASA secretariat explains that the association's aim is to represent all South African abalone producers. If AFASA were to represent a smaller portion of the local producers, it would decrease the association's bargaining power with government authorities and increase the threat of producers outside the association supplying sub-standard produce on the market, thus damaging the image of the South African abalone producers. Instead, AFASA could focus on encouraging and supporting the production of higher quality abalone to enable the industry to attain a premium above farmed abalone from other countries.

- **Bargaining power of buyers**

While some of the respondents felt that co-operative marketing is the solution to their low bargaining leverage, such marketing is not ideal. A co-operative marketing venture will decrease the pressures on individual firms of searching for new markets and innovating and upgrading their products. This lowered pressure would adversely affect the industry's position in the international arena. A more constructive solution would therefore be to increase demand for South African abalone by means of co-operative promotions.

- **Bargaining power of suppliers**

Although the supplier of Abfeed® does not hold substantial bargaining power, it is important for the abalone firms to have local supporting industries. Such industries will cater to their specific needs more directly and are less dependent on exchange rates in general. The abalone firms must therefore work in collaboration with the supplier of Abfeed® to increase the standard of its product and services.

Both the abalone firms and kelp suppliers can benefit from improved relations with each other. How this can be achieved is yet unclear, but the first steps towards this have already been undertaken.

The bargaining power of the kelp suppliers will also decrease once more abalone firms start producing or increase the production of their own kelp.

6.4.2 Recommendations based on the Diamond Model analysis of the South African cultivated abalone industry

- **Factor conditions**

The only significant factor condition that allows for a relative cost advantage is South Africa's abundance of unemployed unskilled and semi-skilled labourers. In order to enhance the benefits they receive from this advantage, South African producers need to increase their investment in human resources.

- **Demand conditions**

South Africa's lack of domestic consumers can be overcome if the local firms take full advantage of the demand conditions they face from offshore activities. The firms therefore need to seek ways in which they can increase the contact

they have with the sophisticated and discerned offshore final consumers, as this will force them to continuously innovate.

- **Related and supporting industries**

The large number of industries able to co-ordinate and share value chain activities with the abalone farms in South Africa provides a competitive advantage for abalone cultivation firms based in South Africa. It would, however, seem as though the abalone firms do not take full advantage of these opportunities. Abalone cultivation firms should seek ways in which they can benefit from the facilities and experience of both the commercial abalone fishing industry as well as the abalone processing sector.

- **Firm strategy structure and rivalry**

The managers of only four of the ten examined firms have direct contact with offshore clients. If the well-informed respondents claiming that offshore agents prefer to deal directly with somebody on the farm rather than with a marketer at a different location are correct, the managers of the remaining six firms ought to change their strategy so that they also have contact with the offshore clients.

- **Chance**

The pressures resulting from a strong exchange rate must spur the abalone firms to innovate and to compete in sustainable markets where price-competition is less significant. The firms should not live in the expectation that the exchange rate will increase as it could lead them towards a dependence on price-sensitive segments and industries. Expecting an exchange rate that strengthens steadily, on the other hand, is likely to encourage efficiency and upgrading.

- **Government**

The total amount of abalone cultivated in South Africa was 201 tons in 2000 and 519 tons in 2002. That is an increase of nearly 260 percent for the two-year period. Apart from this, the industry provides direct employment to 555 workers, the majority of whom are either semi-skilled or unskilled. The data do not only confirm the industry's success during its infancy, but also its importance in the South African economy. However, in order for the industry to keep growing and become even more successful targeted government support is

required. This includes improving the services offered by the South African Bureau of Standards (SABS), the Department of Trade and Industry (DTI) and Marine and Coastal Management (M&CM). The SABS should therefore set up a sampling program that will service the complete shellfish mariculture industry (abalone, oysters, mussels), while DTI should assist the producers with promotions, marketing and receiving foreign delegations, as well as the development and inclusion of Aquaculture policies and legislation.

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